# COMPUTERWORLD

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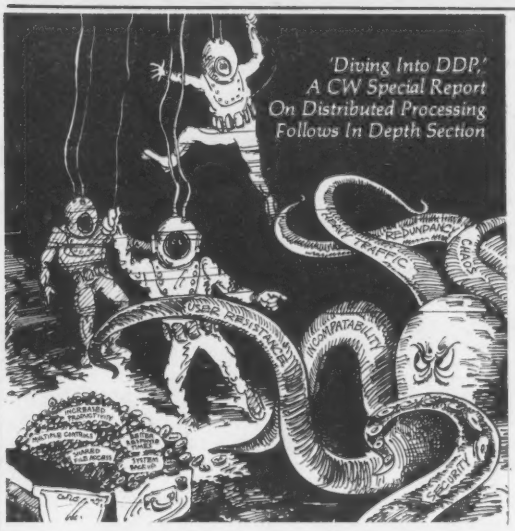
NEWSPAPER




# Staff Turnover No Problem, Surveyed Managers Report

Employee turnover may not be quite the nightmare it has been claimed to be.

A random poll by *Computerworld* of 30 MIS managers across the country produced surprising results — almost three-quarters (73.3%) of the managers interviewed reported little or no problem because of staff turnover, and only 26.6% claimed that turnover was a problem at their installations. What's more, the same group estimated that staff turnover averaged a low 13.5% at their installations last year.

These survey findings are dramatically opposed to the common industry viewpoint that projects the turnover rate at anywhere from 28% to 35% annually. While the CW sample was only a spot check of all-sized installations around the country and, therefore, perhaps not statistically valid, the results may also portend that the old industry bugaboo is nothing but a figment of the industry's fevered imagination.

### Recruiting Hardship

While claiming a low turnover rate, managers are still beleaguered by the hardship of finding qualified personnel, the survey showed. As many as 86.7% of those surveyed stated they had anywhere from a "mildly difficult" to a "virtually impossible" time of recruiting qualified personnel. Only 13.3% (four of the respondents) said they had no problems in hiring qualified computer staff.

Many of the managers claimed they no longer even encountered the kind of qualified people they saw as little as five years ago and so were forced to hire relatively inexperienced personnel or those directly out of college and subsequently train them themselves. "We're spending a hell of a lot of money" in order to find qualified staff, one disgruntled Tulsa, Okla., manager reported.

The "old hardware" at his shop made one Midwestern printing manager's recruitment problems more difficult. The more experienced professionals want the challenge of new hardware, he stated.

Since many of the managers indicated they were forced to hire inexperienced staff, they also estimated that it took a little over eight months on the average for a new employee to work up to potential. While the response varied from as little as one month for an experienced staff person to as long as two years for a beginner, most managers agreed it depended on the job itself.

The turnover rate among computer staff has probably increased over the last five years, according to 46.7% of the respondents. But one-third claimed that the rate of turnover had actually decreased and 10% believed it has stayed the same over the last several years.

In one instance, only moments after reporting little turnover problem, a manager interrupted the CW interview to report that an employee had just resigned and was "walking out the door." When questioned a second time, he still maintained that turnover was not a problem.

Although motivational experts contend that money is not a prime motivator in an employee's decision to job hop, the respondents reported that it was, in fact, better pay which induced their staff to leave for greener pastures in as much as 40% of the time. The second highest factor ci-

*(Continued on Page 4)*

*This Computerworld survey was conducted by staff writers Ann Dooley, Bill Laberis and Lois Paul.*

# Computers to Fuel April Lift-Off Of Space Shuttle 'Columbia'

**By Tim Scannell**
CW Staff

KENNEDY SPACE CENTER, Fla. — Plagued by numerous development setbacks and already two years behind schedule, the space shuttle *Columbia* — aided by a veritable army of computers — will finally lift off this April.

However, although the shuttle is virtually in the air, there are still some minor, mostly electrical, problems affecting what many people are fond of calling the "Space Age Spruce Goose" and "the bird that won't fly."

Basically, the whole success of the reusable shuttle depends upon a variety of on-board and scattered computer systems that take care of everything from prelaunch histrionics to sophisticated midair guidance and tracking. While all of these machines have pretty much performed as planned, there have been a number of minor failures and malfunctions that have delayed progress on the project by

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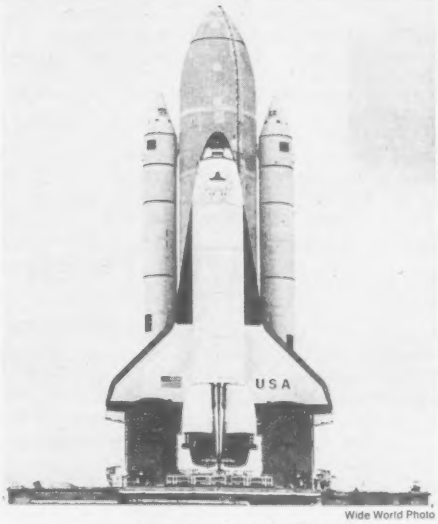


Wide World Photo

**Space Shuttle 'Columbia'**

# *Contract Closes Union Dispute*

**By Jeffry Beeler**
CW West Coast Bureau

LOS ANGELES — Some 100 members of the Western Airlines, Inc. computing staff have apparently scored at least a partial victory in their bid to free themselves from unwanted union control.

The victory came late last month when the systems personnel and their union, the Air Transport Employees Association (Atea), tentatively agreed to a new two-year labor contract.

*(Continued on Page 4)*

# Timeplex Unveils Synchronous Modems

**By Brad Schultz**
CW Staff

LARGO, Fla. — Timeplex, Inc. has announced a high-speed synchronous modem family and, noting that centralized control of network performance is inevitable in data communications, revealed plans to sell the control in a single system.

The largest seller of multiplexers introduced its Advanced Intelligent Modems (AIM) on Friday the Thirteenth. Other companies sell synchronous high-speed modems already, but Timeplex managers called the Thirteenth a lucky day because no other company, they said, can offer up to 16 sets mounted in a single card shelf 10.5-in. high in any combination of 2,400-, 4,800- and 9,600 bit/sec models.

Circuit cards slip in and out of AIM chassis in seconds to replace RS-232C interfaces with the new wave of RS-449s, or a 4,800 bit/sec modem with a model twice as fast.

This erector set modularity allows many possibilities for swift replacement of a modem's vital parts, the spokesmen told the press here at Timeplex's Transmission Products Division (TPD) headquarters. Then they showed the "tech control center."

As Timeplex chairman Edward Botwinick stood proudly nearby, an

*(Continued on Page 8)*

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## *And IBM-Type Batch Machines*

# Four-Phase Adds DDP Systems

CUPERTINO, Calif. — Four-Phase Systems, Inc. last week introduced two multifunction distributed processing systems for large-volume applications and two IBM-compatible batch computers geared to off-load IBM host mainframes.

The IV/80 and IV/95 multifunction distributed data processing (DDP) systems are designed to boost the firm's current line of interactive machines by sporting increased memory and the ability to handle 30% more terminals. Both systems incorporate the company's proprietary 24-bit large-scale integration circuitry and window-into-memory architecture that allows each terminal to communicate directly with the systems' memory. This feature is said to eliminate delays caused by input or output processing.

The IV/80 and IV/95 can provide a communications interface for one or more transmission lines operating at speeds up to 9,600 bit/sec, the spokesman continued. Bisynchronous, asynchronous and Synchronous Data Link Control (SDLC) communications protocols are also supported.

### Disk Capacities

The interactive systems have disk storage capacities ranging from 5M- to 270M bytes and each processor supports up to 32 terminals. The IV/80 and IV/95 feature up to 480K- and 672K bytes of main memory, respectively.

In addition, the two DDP arrivals are compatible with all Four-Phase software, including the firm's Multifunction Executive (MFE/IV) and Office Management Systems (OMS/IV).

Both systems also include recently debuted, ergonometrically designed terminals that feature a redesigned keyboard, palm rests, a tiltable screen with antiglare filter and an optional amber character readout.

The terminal can generate most European languages and is available in keypunch or typewriter-style versions.

The cost of a typical IV/80 system, which includes 480K bytes of memory, 40M bytes of disk storage, 10 terminals, one communications line, two 55 char./sec printers and a 300 line/min printer, is less than $180,000. The system leases for $3,000/mo based on a 42-month plan. The IV/95 system with 672K bytes of memory, 67.5M bytes of disk, 20 terminals, one communications line and a 600 line/min printer is less than $205,000; or less than $3,700/mo on a 42-month lease.

### Batch Processors

The systems 311 and 312 batch processors reportedly enable Four-Phase DDP system users to off-load their IBM host machines by transferring batch applications to remote or local office installations. Both computers are 32-bit machines compatible with the instruction set and I/O channel interfaces of the IBM 370, the spokesman noted.

The System 311 is comparable in power to the IBM 4331 Group 1, while the 312, with a 32K-byte cache memory and greater instruction execution times, is on a level with IBM's 4331 Group 2. The minimum memory configuration of the 311 is 512K bytes and the minimum memory for the 312 is 1M byte, the spokesman added. Both can be expanded in 1M-byte memory increments up to 4M bytes.

Disk capacities range from 100M bytes to 1,600M bytes, and the systems can support tape drives that operate at either 37.5- or 75 in./sec.

The 311 and 312 interactive systems can be tightly coupled via a high-speed bidirectional channel interface over which batch jobs are transferred, the spokesman continued. A low-speed communications channel is also available for loosely coupled applications. Also, both systems can use IBM VM/370, allowing multiple guest operating systems and applications to run concurrently in a virtual memory environment.

### Data Transfer

The 311 and 312's CPU is capable of transfer rates of 16M byte/sec and it can execute non-memory-dependent microsteps at the same time as I/O transfers, the spokesman claimed. The CPU is microprogram-controlled, using a control store to implement the 177 instructions of the IBM 370 instruction set; and has a direct memory access (Dat) facility that translates 24-bit logical addresses into real memory addresses.

When linked with Four-Phase's front-end IV/60, IV/65 or IV/90 and recent IV/80 or IV/95 systems, the systems 311 and 312 are reportedly capable of providing the four major DDP functions: data entry, data base inquiry, word processing and local data base processing.

The System 311 is immediately available as a back-end distributed batch system and costs less than $190,000 for a sample configuration consisting of 1M byte of memory, a console, 100M bytes of disk storage, a tape drive, 16 communications lines and a 300 line/min printer. The 42-month lease cost is less than $3,000/mo.

The 312 with 1M byte of memory, 200M bytes of disk, a tape drive, eight communications lines and a 300 line/min printer costs less than $230,000 and leases for less than $4,000/mo. However, the 312 will not be available until the fourth quarter of this year.

Additional information on the Four-Phase systems can be obtained from the firm at 10700 N. De Anza Blvd., Cupertino, Calif. 95014.

# This Week

**IN DEPTH**

Writing Your First Book: ..... Follows Page 54
The Menace of Micros: A Riposte ..... ID/9
Computer Development: Can the Beat Go On? . ID/17

**NEWS**

Staff Turnover: Myth or Real Impediment? ..... 4
Local-Net Protocol Standards Moving Apace ..... 5
Observers Pondering Divestiture of Bell Labs ..... 6
Computers to Fuel Lift-Off of Space Shuttle ..... 8
Two Charged With Theft, Forgery of Intel Chips ..... 9
Business Graphics Use Proliferates ..... 10
Reams of Output Driving Spread of Graphics ..... 11
AT&T Asks Approval of Private-Line Rate Hike ..... 12
Nixdorf Plans Operating System for IBM 4300 ..... 13
Bell Proposes Revised Rate Schedule for Wats ..... 14
Bad Tidings in Store for Federal Meet Attendees ..... 15
Univac Plans Bracket Systems for 1100 Series ..... 16
Credit Card Listing Services: Are They Safe? ..... 18
Intelpost Expansion Expected in Two Months ..... 19
Managers on the Move ..... 20
Pilots Cancel Walkout After Grievance Meeting ..... 22
Medical Bills Lost in Blue Cross Conversion ..... 23
Securities Exchange System Set for Pilot Run ..... 28
Ohio Scientific Scores With Storage Options ..... 29
Guidelines Created for MRP Package Evaluation ..... 30
Boy Scouts Explore Terminal Technology ..... 32
UPS Lightens Power Plant's Switch to On-Line ..... 34
Books Enrich Management, Software Design ..... 35
EMP Invasion Latest Computer-Room Threat ..... 36

**EDITORIAL**

Editorial: Energy and the User ..... 40
A Eulogy for Old Friends ..... 41
Human Connection: Job Descriptions ..... 41
Taylor Report: Big Changes in Store ..... 41

**SOFTWARE & SERVICES**

Precompiler Efficiency Applies Across Divisions ..... 47
HP Desktop Adds Enhancements ..... 48
System/34 Users Gain Program Control ..... 50
Cobol Converter Fits Medium Burroughs CPUs ..... 51

**COMMUNICATIONS**

Hotel Chain Checks In New Data Scheme ..... 55
'SRM1' Extends Control, Path Selection for 3270s ..... 56
Buffered Interface Out for PDP-11s, Terminals ..... 58

**SYSTEMS & PERIPHERALS**

Diskless PTS/1200 Joins Raytheon Line ..... 63

**MINIWORLD**

Micros Make Rounds With Pepsi Crew ..... 65
Serial, Line Printers Rival System/34, 38 Models ..... 66
'Practice Manager' Designed for Medical Use ..... 68

**COMPUTER INDUSTRY**

Univac Sees Fiscal '81 'Best Year' for Sales ..... 69
Shipments to Europe to Hit $24 Billion Mark ..... 69
'Cram Session' Set for Boston, Wash., L.A. ..... 70

**ADVERTISING INDEX** ..... 116

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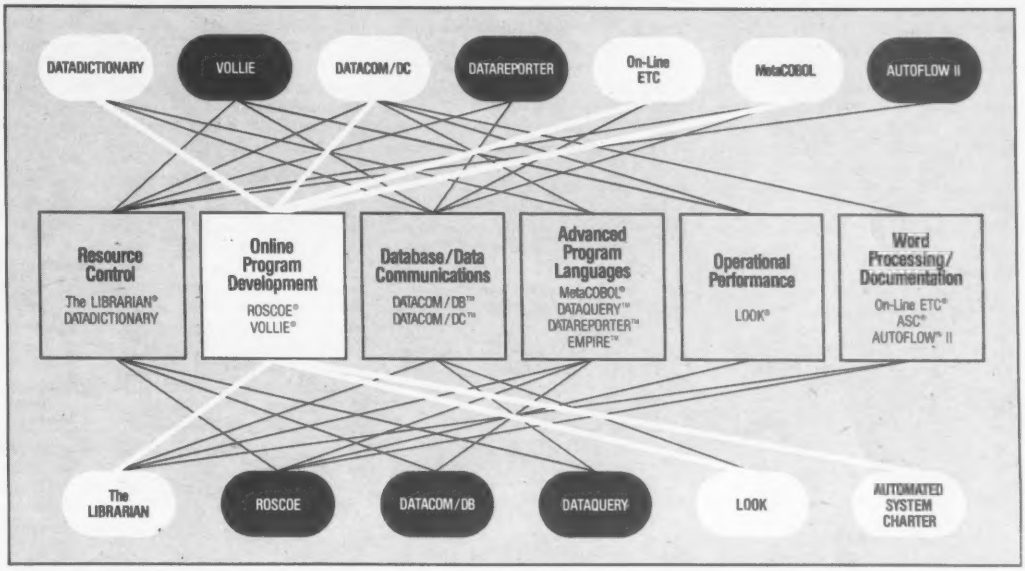


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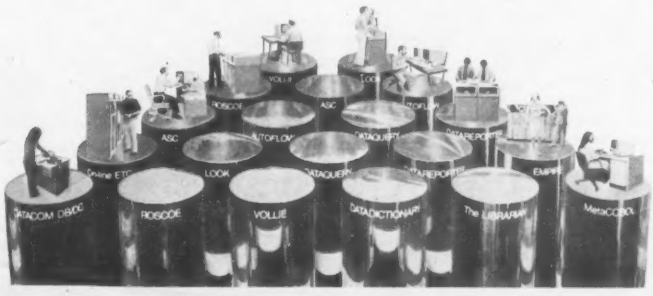


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# Turnover: Myth or Impediment to Managers?

By Ann Dooley
CW Staff

Is computer employee turnover a myth or a real impediment to productivity and work quality?

No one seems to know for sure.

Turnover is generally accepted by the industry to be outrageously high and a burden to the hard-working computer manager. Turnover rates of from 28% to 35% are usually bandied about, but it appears no one in the industry really knows since no recent research can be found on the hard reality of the situation. Neither research groups, recruitment firms, academics, government bureaucracies or computer societies recently questioned by *Computerworld* actually know just what the recent turnover rate is among computer professionals.

While the demand for computer experience is unquestionably high, turnover statistics have come under some question about whether they are as extreme as generally supposed (see story on Page 1).

Corroborating CW's recent pool is a study by International Data Corp.'s Information Systems Planning Service (ISPS), which indicates that less than one-third of all management information systems managers believed that turnover is a problem.

This survey, based on almost 1,000 responses, found that turnover is related to staff size and is higher in large organizations. Small shops cited turnover problems 24.1% of the time, while it was reported to be a problem by 42.8% of the respondents in large organizations.

The ISPS survey concluded that "the much discussed problem of turnover may not be quite as important as it has sometimes been made out to be."

However, Prof. Daniel Couger at the University of Colorado emphatically disagrees with these findings. There is "no question of a turnover problem," according to Couger, who has interviewed more than 100 companies about their employee relations and turnover problems.

And it's not just a scarcity problem; it's a management problem, according to Couger, who noted that when management adopts certain motivational procedures, turnover rates decrease and production rates increase.

"Unlike some industries, we have to hire job-hoppers" — those employees who feel thay can advance more quickly in career and salary by switching from company to company, he said. But the working environment can be improved to retain the people who are willing to stay for a while at one place, but who are presently dissatisfied with their jobs, Couger noted.

### Motivational Factors

Computer professionals have the lowest need for social interaction and the highest need for learning of any of 500 professional groups recently studied, according to Couger.

Managers must learn to appeal to what motivates computer professionals and turnover will decrease, he asserted. "Before, we always thought the answer was in improved technology, but now the need is for management interaction," Couger said. And if managers can be made to realize this need, positive changes can usually occur with very little trouble.

Both Couger and the ISPS survey noted that turnover is most often a result of a lack of job satisfaction.

In the low performance organizations, according to ISPS, 57.8% of the survey respondents are either inclined to agree or definitely agree that turnover is a problem. But in high-performance organizations, only 16.4% either definitely agree or are inclined to agree there is a problem with employee turnover. Correspondingly, in high-performance installations, 60.4% definitely agree that turnover is not a problem, but only 16% believe that to be true in the low-performance organizations identified by the ISPS survey.

When the staff receives rewards for their work, 69.6% definitely disagree that turnover is a problem and only 6.1% definitely agree, the survey found.

But when respondents felt they were not rewarded, 17.2% disagreed that turnover was a problem while 28.3% felt that it was, thereby linking fair treatment with job satisfaction and an employee's desire to remain at one job, according to the survey.

The survey also found that organizations with state-of-the-art programming and analysis methods will have higher performance and lower turnover as opposed to those firms which do not provide this employee stimulation and which will therefore experience just the opposite: high turnover and low performance.

# Staff Turnover No Problem, MIS Managers Report

*(Continued from Page 1)*

ted in job hopping was career challenge, according to the managers, 20% of whom reported that staff left in order to work on more advanced systems or for more intellectual challenge.

Several in this energy-conscious age noted that an employee's decision to leave was often made in order to work closer to home and thereby avoid commuting.

### Recruitment Firms

One embittered Chicago DP manager blamed recruiting firms, whom he called "the most unethical crop of people," as the primary factor in employee turnover.

A fairly intense hostility was revealed by the computer managers toward recruiting firms. More than half of the respondents believed that recruiters directly affected the turnover rate by fabricating a desire to switch jobs that would not have been created without them. While one-third of the respondents reported they had felt no effects of head-hunters, many others stated that raiding was commonplace and that it was not unusual for one or another of their staff to take several calls a day from recruiters calling them directly at work.

One irate manager had a particularly strong antagonism against recruiters, calling them the single biggest problem in turnover. "If I could help pass a law against employment agencies, I would," he said after noting that he had a 100% turnover among his four programmer staff last year.

"They'll do anything to get hold of people and the stunts they pull are unbelievable," he said. "I've had them calling up on any pretext to get the names of my programmers, claiming to be stewardesses or needing their names for an accident report."

### Incentives to Stay

The respondents, which managed installations with staffs ranging from several programmers to several hundred, listed competitive wages as the incentive most commonly offered to retain their personnel.

Standard benefits packages were also offered, as were internal career paths, a good working environment and flex time.

As many as 90% of the managers implemented some kind of training and all agreed that it was probably effective in retaining employees. Several of the managers, however, expressed fears that training could also have a negative effect — enabling people to move on to better jobs.

The managers estimated that a programmer typically stayed three to four years at any one installation before moving on to another job.

### 'Survival Mode'

Turnover hampered their computer operations either little or not at all, according to 60% of the managers who claimed they were able to "get by," double up on jobs or find replacements before things got out of hand. But for the one-third who claimed that turnover affected their operations, vacations were sometimes canceled and schedules were tightened up. As one Chicago manager of a small shop noted, "We go into a survival mode and all projects are postponed."

Turnover may be an inherent part of the computer industry — something that comes with the territory, according to some of the managers. Others felt that the problem was directly linked to the supply and demand problem and once — if ever — a better balance was reached, turnover would drop off.

A more stimulating and pleasant work environment might halt turnover in some cases, while other managers felt that better screening at interviews to find the right candidate for the right job would solve turnover problems, as would involving staff with the company as a whole. And the one Midwestern DP manager with the grudge against recruiters felt that turnover could be solved if agencies were able to be regulated.

# Airline Computer Staffers Win Round in Union Fight

*(Continued from Page 1)*

Forged after months of negotiations, the proposed contract gives Western Airlines' programmers and systems analysts a high degree of autonomy from the rest of the 4,000-member Atea, which is composed overwhelmingly of clerical workers and other nontechnical personnel.

In general, the agreement exempts Western's computing employees from many of the regulations and restrictions that apply to most of Atea's other 3,900 members. For example, the contract reportedly spares the programmers and analysts from having to punch a time clock, guarantees them access to flexible working hours, deemphasizes seniority as a factor in career advancement and lifts many of the formal constraints governing job changes and promotions.

### Special Fringes

The contract also specifies optional long-term disability insurance and several other fringe benefits not available to the nontechnical majority of Atea's membership, according to Western Airlines systems analyst Elizabeth Davidson, who represented her coworkers in negotiations with management and union leadership.

But before the proposed agreement can become legally binding, it has to be submitted to Western's computing employees for review and win their approval in a formal vote. Davidson expects the required balloting to take place as early as the end of March and foresees no serious obstacles to the contract's speedy ratification.

Reaction to the tentative pact seems to have been generally favorable thus far. "Given the circumstances, I think most of our membership is very pleased with the results of our contract negotiations," Davidson said.

### Brac Takeover

Western's programmers and systems analysts first became involved in union activities late last May when the employees were unionized without their prior knowledge or consent by an international labor organization known as the Brotherhood of Railway and Airline Clerks (Brac) [CW, Aug. 18, 1980].

Two months after the forced unionization, Brac lost its Western Airlines chapter, including the newly unionized computing employees, to the Atea.

Before falling under Brac's influence, Western's programmers and systems analysts had traditionally been considered exempt from union control. Thus, many of the employees deeply resented Brac's takeover, and some even began to look for ways to sever their union ties completely and form their own separate bargaining unit.

But in the end, the dream of total independence proved unrealizable, and the employees were forced to seek the next best alternative: to negotiate a new labor contract that would give them as much autonomy as possible while keeping them within nominal union control.

If approved, the computing employees' contract will expire in June 1982, and negotiations for a follow-on agreement are already tentatively slated to begin this coming December.

## *'About 95% Complete'*

# Local-Net Protocol Standards Moving Apace

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Development of a standardized communications protocol for local-area networks is moving forward rapidly, two of the project's managers reported last week, shortly after the latest drafting session ended in Boca Raton, Fla.

A draft specification covering the physical/electrical interface needed between a terminal and its associated media access unit (MAU) is now "about 95% complete," according to Nathan Tobol, a senior engineer at Codex Corp. and technical manager of a subcommittee established several months ago by the Institute of Electrical and Electronic Engineers (IEEE) to develop one portion of the standard.

The MAU is a modem-like device through which the terminal communicates with the local-area network transmission bus typically a coaxial cable. Another interface, between the MAU and cable networks employing broadband transmission, is "80% to 90% complete," said Tobol.

Tobol also reported that substantial progress was made at Boca Raton in developing an MAU interface to local networks employing baseband transmission. A rough draft of a similar interface for optical-fiber-based local networks has been completed, he added.

While Tobol's group works on physical/electrical interface standards, another IEEE subcommittee — headed by Gerald Clancy of Honeywell, Inc. — is developing standards specifying the header and trailer codes that accompany data transmitted between MAUs.

Three specifications are being developed: one is a data link protocol, the other two are media access protocols. Clancy said this group has now completed a draft of the link protocol and expects to have drafts of the access protocols finished by the end of April.

A data link protocol specifies the format and meaning of the address and certain control fields in the message header. It determines, among other functions, the kinds of supervisory messages that can be transmitted back and forth between sender and receiver and how calls will be established and terminated. A media access control protocol determines how contending terminals will use the network's common transmission path without getting in each other's way and specifies the "frame check sequence" — the code used at the receiving end to detect errors.

The specifications developed by Tobol's and Clancy's subcommittee will, when completed, go to their parent group, known officially as the 802 Committee. After approval at that level, the documents will be distributed for public comment.

The final step — approval by IEEE's computer society — is expected early next year.

# DG Adds Option, Boosts MV/8000

WESTBORO, Mass. — Data General Corp. has introduced a single-board floating-point processor (FPP) option for its Eclipse MV/8000 that reportedly makes that machine the fastest 32-bit virtual memory computer on the market.

At the same time, the firm also announced an increase in the MV/8000's main memory from 2M to 4M bytes.

The FPP option increases the speed of the MV/8000's double-precision calculations used in engineering and scientific applications. With the option, the computer's double-precision Whetstone value is 875K instruction/sec, as compared with Digital Equipment Corp.'s VAX-11/780's value of 725K instruction/sec and Prime Computer, Inc. Model 750's value of 714K instruction/sec. Each machine's double-precision values are 1,150K-, 1,133K- and 1,141K instruction/sec, repectively, a spokesman said.

### Floating Point Formats

Floating-point instruction formats for the FPP are said to be identical to the previous Eclipse MV/8000 microcode formats, resulting in complete user transparency to floating point implementations. In short, programs written earlier for the MV/8000 will run without modification on the modified Eclipse computer.

Users with installed Eclipse MV/8000 computers can upgrade their configurations to include the FPP without reprogramming, the spokesman added.

The FPP Model 8704 costs $8,800 with delivery in about 120 days.

The increased Eclipse memory basically permits more users to have larger resident programs, reducing disk overhead, the spokesman continued. It is packaged in two configurations — 3M- and 4M bytes — which consist of multiple 500K-byte boards.

Two newly packaged MV/8000 computer systems incorporate the memory modules: the Model 9370 with 3M bytes and the Model 9380 with 4M bytes. The systems costs begin at $221,000 and $249,000, respectively.

DG is located at Rt. 9, Westboro, Mass. 01581.


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# Observers Pondering Divestiture of Bell Labs

By Brad Schultz
CW Staff

MURRAY HILL, N.J. — Bell watchers are speculating that AT&T may soon divest itself of Bell Laboratories here, a world-renowned research center. If so, a major software house may be born because the Unix operating system and other software developed by Bell Labs is already popular with scientists and may soon win hearts among commercial users.

To settle the federal antitrust suit against AT&T, Bell Labs and Western Electric Co. may emerge as independent companies. Besides making and selling DP hardware for AT&T, Western Electric sells software developed by Bell Labs and is also the prime testing grounds for that software before it is marketed anywhere, according to Jerry L. Dreyer, president of the Association of Data Processing Services Organizations, Inc. (Adapso).

Several scenarios for the emergence of a Bell software house are plausible, Dreyer indicated. Bell Labs, or portions of Bell Labs structured as a new and separate company, might wind up selling the Unix library as it is made more suitable for commercial DP. Or Western Electric may continue as the Unix seller — if the federal government withdraws objections to the close relationship the company has with Bell Labs.

Adapso has not withdrawn its objections. On Aug. 20, 1979, the association sent then-Assistant Attorney General John H. Shenefield its formal complaint that "AT&T and Western Electric are blatantly violating Sections IV and V of the [1956 Consent Decree] by publicly offering for licensure computer software packages which have general purpose applicability."

The Computer & Communications Industry Association (CCIA) also complained to the Justice Department about the marketing of software developed by Bell Labs. Justice's response to those protests was not very sympathetic, CCIA president A.G.W. Biddle told *Computerworld*. "So far as they were concerned, the software was scrap," he recalled.

### 'Scrap' Material

Dreyer explained that federal regulators permit AT&T to sell software developed internally by its operating companies under certain conditions: it should help users trim their communications overhead — in most cases, much of what users pay AT&T — and it should not be "enhanced" for a market outside AT&T.

But this "scrap" has sold well to academic users around the world, where it normally runs on Digital Equipment Corp. computer systems. That means many of the presently emerging generation of computing professionals are weaned on Unix, Dreyer pointed out, and — as the faculty job announcements published by the Association for Computer Machinery regularly demonstrate — many computer scientists are now expected to advance their art at Unix installations.

AT&T earned about $2 million from sales of Unix products during the past two years, Dreyer told CW. Yet Bell's marketing of software went virtually unmentioned amid the Federal Communications Commission's First and Second Computer Inquiries and the Justice actions to date, the Adapso president said.

Within Bell Labs, researchers have used Unix to experiment with systems for development of other systems and to find best approaches to distributing DP resources. At the Digital Systems Research Laboratory in Murray Hill, for example, Dr. Alan M. Usas developed a "Unix environment" in which to investigate the effectiveness of "future services and systems."

At another Bell Labs facility in Holmdel, N.J., Alan L. Glasser and David M. Ungar developed a distributed Unix system that "supports a community of several hundred computer programmers." They found that a transparent remote file system can allow Unix to effectively support such large "user communities."

The Bell Labs researchers found a way to "greatly simplify the task of porting software from the DEC PDP-11/70 to the DEC VAX-11/780." Because Unix normally runs on DEC systems, Bell Labs has in fact done much to extend the range of capabilities possible with those systems.

Biddle and Dreyer said their respective complaint filings are still officially under consideration by Justice. CCIA and Adapso will wait at least until the March 2, 1981 deadline for a negotiated settlement between Justice and AT&T before considering further actions on the Bell software business.

Federal district court Judge Harold Greene has vowed the antitrust case will go to trial should a settlement not be reached by that date.

# AT&T's 'C' Called Flexible Language

By Brad Schultz
CW Staff

CAMBRIDGE, Mass. — Bell Laboratories' C "is a flexible yet well-structured higher level language system with a large body of existing library routines and development support tools," according to BBN Computer Corp. marketing analyst Bev Josephs in a forthcoming *Computerworld* article.

Bell Labs created the Unix operating system in 1969 and rewrote it four years later in C, Josephs noted. "Unix is an advanced interactive operating system of unusual simplicity and generality. It is easy to comprehend, yet powerful enough efficiently to satisfy a wide range of user demands," she said.

BBN Computer rejected Cobol, Fortran and Lisp — the lingua franca of artificial intelligence — as languages with which to create DP products, instead choosing C, "whose accessibility, combined with its level of abstraction, make it ideal for systems coding," Josephs wrote.

"However, C is equally useful for writing major numerical, text-processing and data base programs," Josephs asserted, "and for writing operating systems."

The Bell Labs language's "machine independence eliminates any conversion effort required when transferring software from one machine to another."

Much software will be transferred from one machine to another in the 1980's as users decentralize DP resources and employ the new network architectures designed to allow communication among different brands of computer systems. And according to a recent survey of Unix users, many vendors want the Bell software in order to meet user demands for portable packages.

They also want the right to enhance Bell software and sell it as OEMs, The Santa Cruz Operation, Inc. determined in its poll of 63 Unix users. "A surge of interest" in Unix among commercial DP vendors moved them to form a new association called "/usr/group" to promote and standardize Unix in the commercial marketplace, said Doug Michels, vice-president of the Santa Cruz, Calif.-based consulting firm.

The /usr/group survey was conducted last October and revealed 30% of the respondents to be computer equipment manufacturers, 23% to be consulting firms and 19% to be software vendors, Michels reported. The Bell software users were asked to rate the relative adequacy and importance of Unix features, the desirability and need for Unix in applications and the adequacy and importance of Unix utilities.

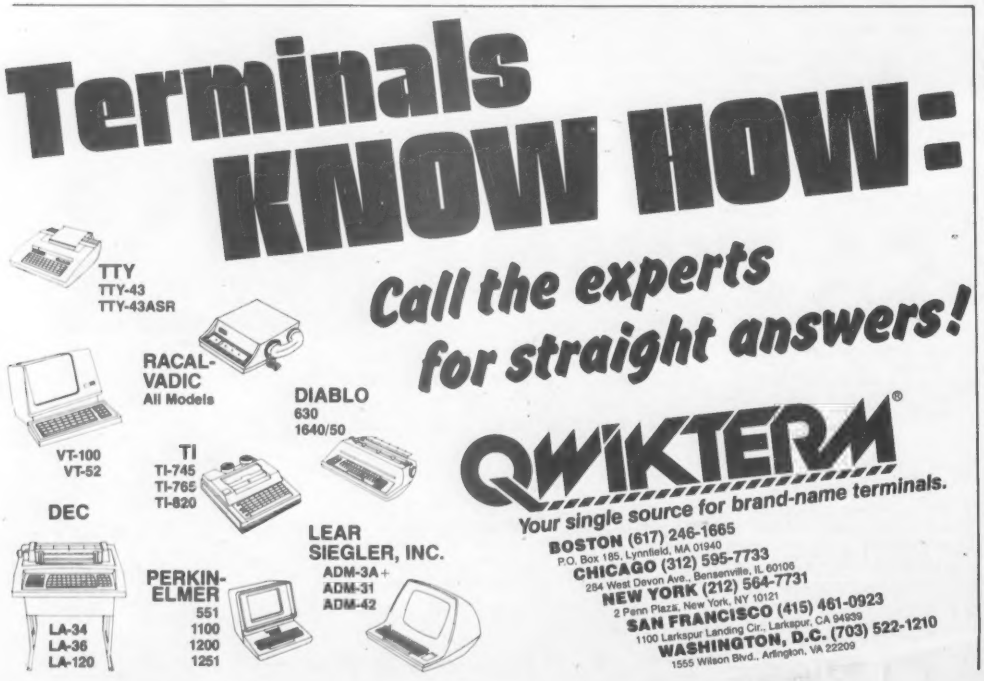
### File System

Santa Cruz Operation found the most adequate features of Unix to be its hierarchical file system, ability to transfer application programs to different machines under the operating system, and its modifiability. The least adequate feature, the users said, was user and system documentation.

The most desirable application areas for Unix-based products were reported to be document preparation and management, electronic mail and interactive data base management. The trend toward integrating DP with office automation and telecommunications functions would seem to make this applicability of the Bell software especially poignant.

The processors favored most as Unix hosts were said to be Digital Equipment Corp.'s PDP-11 family and Zilog, Inc.'s Z8000. The survey found the PDP-11s, Z8000 and Motorola's 68000 to be the processors most favored for Unix-based development projects.

A summary of Santa Cruz Operation's survey of Unix users is available for $15. The company also offers a "comprehensive analysis" for $75 at 500 Chestnut St., Santa Cruz, Calif. 95060.

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# Computers to Fuel Lift-Off of Space Shuttle

(Continued from Page 1)

days and weeks at a time.

For instance, late last year, CBS News' television cameras documented a failure of one of three Data General Corp. computer systems used to process testing data on the shuttle's three 75,000 horsepower engines. The DG Eclipse S/130 and two Nova 4/S computers are located at the National Space Technology Laboratories (NSTL) testing facility and are manned by employees of Rocketdyne, a division of Rockwell International.

Engine tests involve checking for the rate of fuel flow — which is crucial to continued thrust — to monitoring the timing between the opening and closing of scores of valves [CW, Oct. 13].

The computer failure occurred while CBS was filming a documentary on the space shuttle, which aired earlier this year. Basically, the computer crashed because of a power failure that could have been caused by a damaged cable or some loose electrical wires. The problem was finally solved by consulting with 36 engine experts across the country, the report said.

Representatives at NSTL in Mississippi could not be reached at press time to answer whether the CBS incident was an isolated instance or a common problem.

Meanwhile, in Florida at the launch center, technicians ran into electrical problems last week with a number of Pratt & Whitney Aircraft Co. fuel cells used as part of the shuttle's power reaction storage distribution system, a spokesman said. The cells are based on a liquid hydrogen/liquid oxygen type of power source, and workmen ran into trouble when they tried purging the tanks of the system. The cells are not directly related to computers at the center, but did cause a five-hour delay in testing while certain "contaminants" were expelled.

### 'Minor' Problems

More directly related to the success of the *Columbia*, and the lives of its crew members once the ship is airborne, are five IBM Advanced System Four Pi Model AP-101 general-purpose computers that are used on board for guidance, navigation and control functions. While these computers usually function flawlessly — one acting as a primary system and the four others providing backup support — there are occasional "very minor" problems, a National Aeronautics and Space Administration (Nasa) spokesman said.

"We do run across occasional little glitches every once in a while, but I'd hate to call them serious problems. They're just minor annoyances," the spokesman explained.

One of these "minor annoyances" involved the primary IBM computer system delivering false readings on a number of the *Columbia's* systems meters. These inaccurate readings caused the backup computers, in turn, to work with slightly false information. However, before any damage could be done, these false readings were caught by the launch facility's extensive troubleshooting network.

"We have triple redundancy on most of our systems . . . and occasional false readings are nothing unusual for this type of program," the Nasa spokesman related.

As this story went to press, technicians and scientists here were gearing up for a 20-second static engine firing test, scheduled to take place last Friday. The test is considered to be one of the final steps to determine flight readiness and is "a milestone toward the first launch," the spokesman said.

The *Columbia* will undergo a more extensive ascent and descent simulation flight in about three weeks, which will include a "once around abort" that will simulate what will happen if an in-flight failure occurs. Basically, all testing bases are being covered, the spokesman noted.

During the static test two Modular Computer Corp. Modcomp II/45 minicomputers, which make up the center's Launch Processing System, will automatically take care of all the prelaunch commands in preparation for lift-off. At the same time, two Honeywell, Inc. 66/80 large-scale processors, acting as host computers, will act as an information library for the front-end minicomputers, providing launch checkout details.

Both computer systems will play a key role when the shuttle lifts off this April on its virgin 54-hour flight from here to Edwards Air Force Base in California's Mojave Desert.

# Timeplex Unveils Synchronous Modems

(Continued from Page 1)

integrated bank of data communications hardware was introduced as monitoring line conditions while 16 AIMs gurgled in its midsection.

This tech control center held data net functionality that would have filled a large room a few years ago, a Timeplex engineer explained.

The tech control concept arose because rapid growth in the size and complexity of data communications systems has made patching, switching, monitoring and testing of both analog and digital lines a "real mess," Botwinick observed.

To contain the mess, tech control centers manned by a single operator have arrived. They do things like count the number of message packets that pass through the user's available packet-switched network in good condition. This is useful because packet nets charge the user according to how many good packets they convey.

Tech control centers can also sense the activity on circuit-switched lines leased from phone companies, which is useful because phone companies normally charge the user a flat fee per line each month, even if some lines run nothing at all.

Actually, some of these functions are now performed by the statistical multiplexers Timeplex sells, the TPD engineer noted. However, Timeplex plans to build integrated data communications systems from a melange of modems, multiplexers that reduce need for modems, network diagnostics and performance monitoring gear and other gadgets. This would make Timeplex the user's sole source for nearly all important data communications hardware.

The Series 4800

### Reduced Host Demand

The systems on Timeplex drawing boards will also reduce processing demands on the user's host mainframes because much network management software, such as IBM provides, will be rendered unnecessary, their chores taken up by the tech control machine.

Besides giving the user solid evidence of how well phone companies and packet-net carriers are supporting data communications links, the coming control systems will have bells, if not whistles, to signal outages. Timeplex will tailor them to fit computer rooms.

"A small, simple network will not justify an expensive automated control system," Botwinick declared, "but basic manual patching and switching will be a real asset. Larger systems, or those with critical data transmission requirements, like banks, need more reliability," he said.

The Timeplex chief estimated that systems of this sort will cost the user between $10,000 and $100,000, depending on how much of the user network each system will administer, how active the network is and special user needs. The control system would typically handle 10% to 25% of the user's network resources, he speculated.

The three AIM models are called Series 2400, Series 4800 and Series 9600. The first model offers 2,400- and 1,200 bit/sec operation; the second model runs at 4,800- and 2,400 bit/sec; and the third at 9,600-, 7,200- and 4,800 bit/sec. When running at top speed, any of the three AIMs will fall back to half speed should line signals deteriorate in quality.

AIM options include a four-channel bandsplitter on the Series 9600; two-channel bandsplitter on the Series 9600 and 4800; and, for all models, asynchronous to synchronous conversion and the same conversion with automatic error correction.

Asynchronous terminals typically lack error detection and correction capabilities, another Timeplex spokesman maintained. "I'm sure some of you have seen garbage being printed on a CRT," he said. "The usual correction method is for the operator to resubmit the last sequence, perhaps even restarting the entire procedure."

Timeplex, on the other hand, has made automatic error detection and error correction internal to the modem, so the terminal operator is oblivious to the process. By putting such functions in the modem or some other portion of the integrated system envisioned by Botwinick, terminals can be kept dumb and cheap, the engineer said.

The Series 2400, 4800 and 9600 cost $935, $2,975 and $6,500, respectively. Their diminutive size means the user can save on power consumption by air conditioners and the modems themselves, a spokesman said.

Deliveries are slated to begin in July. Timeplex headquarters is at One Communications Plaza, Rochelle Park, N.J. 07662.

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*Second Time Around for One*

# Two Charged With Theft, Forgery of Intel Chips

By Jeffry Beeler
CW West Coast Bureau

SAN JOSE, Calif. — Local police have arrested two California electronics company executives who are believed to have played key roles in an international chip stealing and counterfeiting ring.

The two suspects, John Henry Jackson and Patrick Ketchum, are alleged to have illicitly obtained some 10,000 Intel Corp. memory circuits, stamped the devices with counterfeit Intel logos and then shunted the products through underground third parties to Siemens AC in West Germany.

When first exposed, the suspected scheme was thought to have possible connections to the Mafia, but thus far, "we haven't uncovered any evidence to confirm that rumor," according to Captain Robert McDermott, who heads the Organized Crime Unit of the Santa Clara County Sheriff's Department.

Jackson, who formerly headed the Dyno Electronics Store in nearby Santa Clara, is well known to local law enforcement authorities familiar with the booming trade in contraband semiconductor chips.

Slightly more than a year ago, the 42-year-old Jackson was charged with receiving stolen property after police allegedly found an estimated $40,000 worth of purloined Intel semiconductors in his Silicon Valley home [CW, Jan. 28, 1980]. The charges were later dropped.

Ketchum, one of Jackson's suspected accomplices, heads Mormac Microtechnology, Inc. in Van Nuys.

Local law enforcement authorities first got wind of Jackson and Ketchum's latest alleged plot when they heard reports that Siemens in West Germany had received an unusually large shipment of Intel Model 2732 memory chips, which are almost always in acutely short supply. Curious as to how so many of the scarce devices could have found their way to one location, area investigators checked with various undisclosed sources inside Siemens and allegedly traced the suspicious shipment to Jackson, according to Intel's chief security officer John O'Loughlin.

After gathering additional evidence in the case, Sheriff's Department investigators obtained a search warrant and entered Jackson's home in nearby Sunnyvale. There, they reportedly found a metal-stamping machine outfitted to produce phony Intel logos. The find led eventually to Jackson's and Ketchum's arrest. Both suspects were charged with grand theft, conspiracy and forgery and were later released after paying $10,000 each in bail.

Investigators here theorized that the stolen 2732s were intercepted in November 1979 as they made their way through the company's testing and inspection cycle. The interceptor was apparently a former Intel employee who left the firm "about three or four months" ago, O'Loughlin said.

# Computers Evil To Ayatollah

By Lois Paul
CW Staff

Hewlett-Packard Co. and Data General Corp. are down to single-staffer operations.

A Digital Equipment Corp. PDP-11/34 intended to automate the Bank Melli remains stranded at a U.S. airport.

And 400 DPers at the National Iranian Oil Co. are out of work.

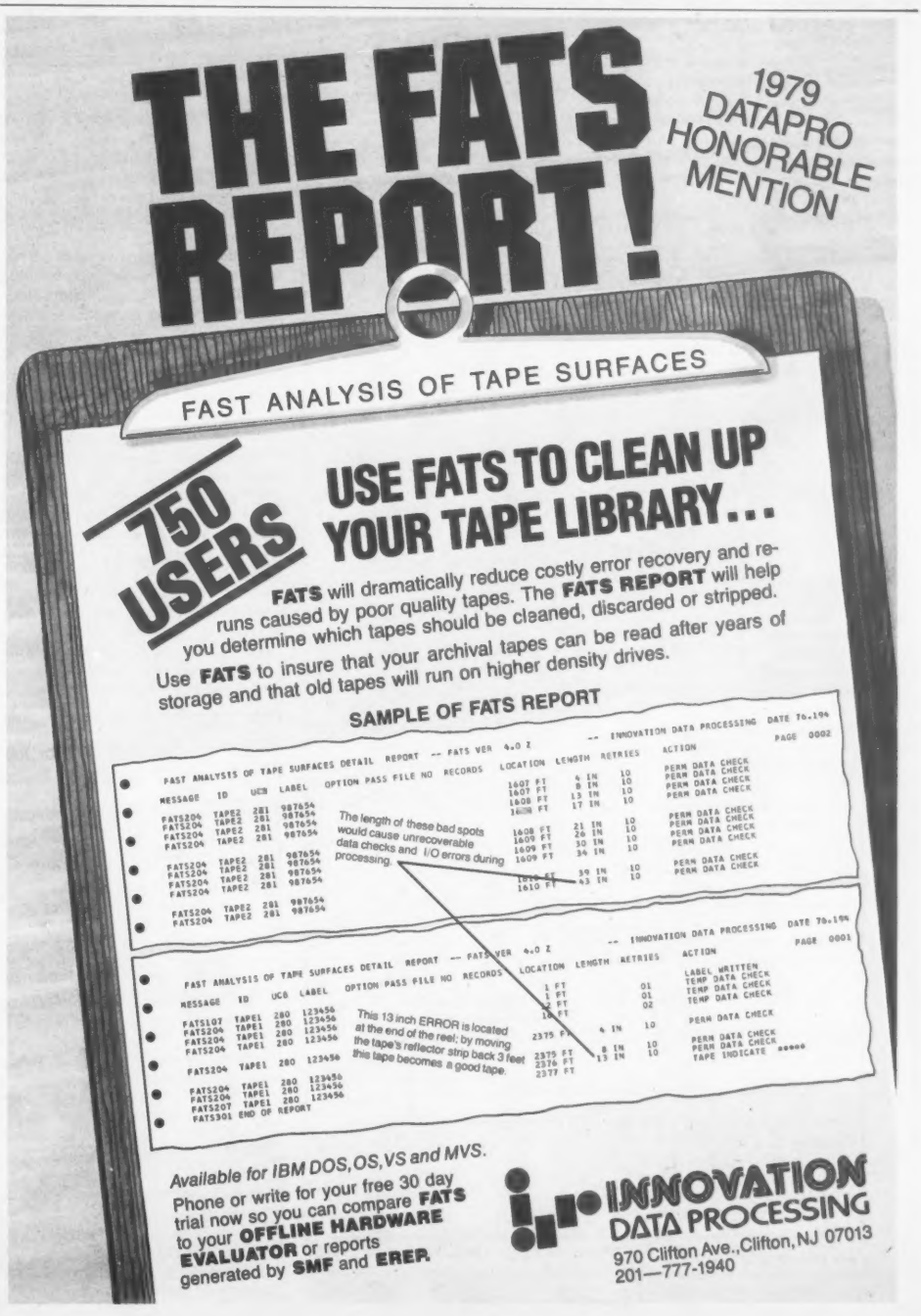
That is the DP situation today in Iran as described by Hushong Kahen, former managing director of Iran Digital Computers, a DEC OEM. Kahan spoke from the New York office of his current firm, International Digital Electronics, another DEC OEM that also markets bilingual terminals for Arabic countries.

Kahen has kept abreast of the situation through weekly reports from the present managing director of Iran Digital and other sources in the country. "The whole industry started crumbling because computers were considered the sign of Satan," he said. "Computers were taboo. They started looking at an abacus instead of a computer. It is sad because the industry was really moving quite a bit."

"Many U.S. and European companies are standing by for word they can go back," said Shapour Nemazee, former editor of *Mideast Computer*, a *Computerworld* subsidiary, from his Alexandria, Va., home where he currently works as a freelance writer. "Essentially, the DP industry in Iran is back to square one."

According to Kahen, HP and DG are maintaining essentially single-staffer operations in Iran, Univac people have left the country and "I don't believe there are any service men left from Control Data Corp.

"IBM service is being managed by a group of ex-IBM service [personnel] who have taken advantage of this revolutionary mood in Iran. They have put the nationalistic hat on their heads and have set up their own service company. I believe they have gotten several contracts," Kahen said.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# Business Graphics Use Proliferates

By Marcia Blumenthal
CW Staff

WALTHAM, Mass. — Although users have expressed some skepticism about using graphics for business applications, once graphics is introduced into an organization its use proliferates rapidly.

Some 71% of current users of business graphics equipment were planning to purchase additional equipment within the next couple of years, according to an informal survey conducted by International Data Corp. (IDC).

The most frequent applications for business graphics were management presentations and financial planning. Of the 144 sites surveyed, 85% were using graphics for presentations and 59% employed the technique for financial planning (see Figure 1).

Tempering the enthusiasm for graphics is concern about the availability of high-quality output devices and easy-to-use application software. The lack of user-friendly software has been one of the most serious deterrents to more widespread use of business graphics, industry experts agree (see Figure 2).

Another concern in the industry has been how graphics fits into the overall DP function. However, IDC's survey revealed 42% of the sites reported producing graphics at the central computing facility, usually in an interactive environment.

## Industry Spotlight

**AVERAGE RATING OF TYPICAL GRAPHICS EQUIPMENT FEATURES**
**(3 = very important; 2 = important; 1 = not important)**

| Feature | Average Rating |
|---|---|
| Image Quality of Hard-Copy Output | 2.8 |
| Application Software | 2.6 |
| Image Quality on Display | 2.4 |
| Turnaround Time for Hard-Copy Output | 2.4 |
| Ability to Access Large Data Bases | 2.3 |
| Cost of Equipment | 2.2 |
| Cost of Output Media | 2.0 |
| Four Colors | 2.0 |
| More Than Four Colors | 1.8 |
| Stand-Alone Capability | 1.7 |

Source: International Data Corp.

Figure 1

Some 60% of the graphics output is slated for use by top and middle management. The remainder of the output was destined for use by specific departments within the organization, for training or for the firm's customers, IDC noted.

Because end-user-friendly graphics software is not widely available today, 36% of the sites surveyed employed at least one computer graphics specialist.

### Independents Favored

Despite obstacles, users seem to be adding graphics capability to their central sites as boards that adapt alphanumeric terminals for graphics use become available, IDC noted. However, many of the users who have added graphics to IBM sites have selected displays from independent vendors, the survey revealed. Tektronix, Inc.'s displays were used at 50% of the sites surveyed.

While central computer sites were producing graphics materials in nearly one half of the cases, more than one-third of the companies reported data was being stored in a stand-alone system, primarily because data in the central computer was not in a form that could be manipulated by available graphics software.

As for software, 64% of those surveyed reported using software developed at least partially in-house and 63% reported they obtained some software from hardware vendors.

Among independent software suppliers, the most frequently cited vendor was Integrated Software Systems Corp. (Issco). Issco's software runs on a variety of hardware including most mainframes and some 32-bit minis.

Acquiring graphics equipment was most frequently authorized by top management of the company (30% of the 90 sites responding to this question). The second most frequent authorizing source was the management information systems (MIS) director (21%). However, MIS directors specified the type of equipment in 39% of the sites responding to the survey (see Figure 3).

The high degree of management involvement in equipment procurement seems to be logical because executives use the largest proportion of the business graphics output.

### Purchase Intentions

Although IDC's survey noted the business graphics market is still too unstructured to draw predictable conclusions, the survey did examine purchase intentions of users.

Thirty vendors are currently represented at the installations surveyed. The top four vendors by number of sites are IBM, Digital Equipment Corp., Hewlett-Packard Co. and Tektronix.

Of the sites participating in the survey 71% plan to buy additional graphics equipment in the next couple of years, with 50% responding they plan purchases this year.

- 45% of the sites said they planned to buy one graphics terminal, with 64% specifying a color terminal.
- 33% were planning to buy hard-copy equipment.
- 11% were planning to purchase additional graphics systems.

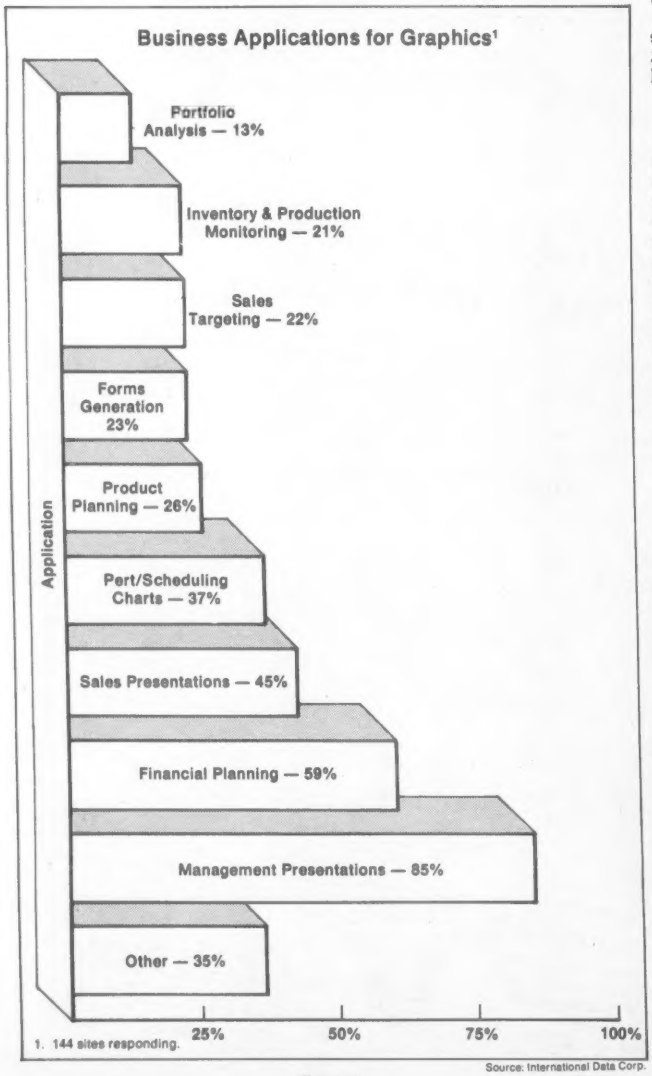


Figure 2

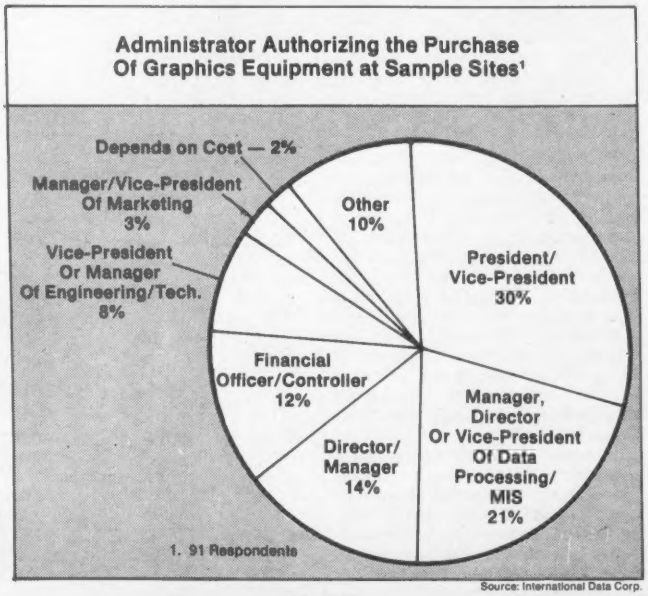
Administrator Authorizing the Purchase Of Graphics Equipment at Sample Sites¹
Depends on Cost — 2%
Manager/Vice-President Of Marketing 3%
Vice-President Or Manager Of Engineering/Tech. 8%
Other 10%
President/ Vice-President 30%
Financial Officer/Controller 12%
Director/ Manager 14%
Manager, Director Or Vice-President Of Data Processing/ MIS 21%
1. 91 Respondents
Source: International Data Corp.

Figure 3

*Data-Information Conversion Problems*

# Reams of Output Driving Spread of Graphics

By Marcia Blumenthal
CW Staff

Making sense of the ever-swelling reams of computer output is driving the acceptance of computer graphics for business applications.

"A prime problem is converting data to information," remarked Mark Rawlins, marketing manager at Integrated Software Systems Corp. (Issco).

Graphics, and particularly color graphics, is just another dimension of computer capability, according to Peter J. Curnin, president of Intelligent Systems Corp. (ISC).

Until now users have viewed the information cycle as inputting, processing and outputting data. However, the presentation of data should be considered part of the total computer application, Curnin maintained. Unfortunately, the graphics aspect is now generally not considered when users buy systems.

Although the dawn of the era of business graphics has been touted ever since IBM's introduction of its 3279 color graphics display terminal nearly two years ago, business applications represented only 4% of the $1.4 billion graphics market last year, according to Strategic Business Systems, Inc.

Initially, graphics was seen as a way of improving managerial productivity. But that application is somewhat limited, observed Carl Machover, who is considered one of the few experts in the graphics market.

Like Curnin, Machover sees spectacular demand for graphics systems used to produce business presentation material. Today an average transparency can cost between $40 to $140, but can be produced on a graphics system for about $25.

Stand-alone systems that create graphics for business presentation can be purchased for between $20,000 and $90,000. However, despite its phenomenal potential, the business graphics market still has a lot of rough spots to smooth.

User acceptance is a continuing difficulty, but vendors see that hurdle toppling quickly. Management information systems (MIS) managers have to be convinced that graphics won't crash the system or destroy the integrity of the data base, noted Issco's Rawlins.

### Data Base Difficulties

A more serious problem, particularly for managers who want to use graphics, is the central data base.

Data base management systems currently installed are designed for transaction processing rather than the provision of summary data, noted Bruce Woolpert, product marketing manager at Hewlett-Packard Co.

Woolpert suggested creating a new, separate data base for use by managers. "If business graphics is going to work, the data that managers need has to be available," he said. Executives are concerned with exception data, trends and historical information, which often are not stored in the central system.

This perspective, however, will cause MIS managers to view their jobs differently, he added.

HP sees the business graphics market as an outstanding opportunity and recently introduced its Decision Support Graphics package for the HP 3000.

Traditional graphics systems used for computer-aided design and manufacturing are often geared to a one-shot drafting task, Woolpert explained. Business graphics needs the ability to store charts in "graphics portfolios" and the ability to continually manipulate, update and interpret stored data in different ways.

### Software Problems

One of the major problems with today's software is it is difficult to merge graphics software with the data on file in another language or to create a structure that makes it easy to display information graphically. It has been estimated that as much as 50% of the code of a program may be devoted to overcoming this problem.

At the present time only a few companies offer software for these tasks that can be used by managers with little computer training.

In addition to the need for new approaches to software design, acceptance of graphics is presently stymied by the lack of standards for programming languages, for communicating data and for the graphical representation of standard business data.

**Industry Spotlight**

Currently vendors are cooperating in various industrywide efforts, such as the Special Interest Group on Graphics of the Association of Computing Machinery, to standardize graphics programming languages.

Another sticky wicket is the absence of an accepted way to present financial data. Common income statements and balance sheet formats have not yet been standardized graphically. Accounting firms are going to have to take a position on the way graphs should be standardized, Machover stated.

Although IBM has blessed the use of graphics for business by bringing its 3279 terminal into its mainstream product line, most vendors do not see IBM as a major threat to independent suppliers.

IBM's strategy has been to deal graphically with information that resides in the central data base, which is not necessarily the information manager's need, ISC's Curnin noted.

The "mean time to anger" using IBM's current graphics software is pretty short, maintained Rawlins, who described IBM's offerings as relatively unsophisticated and inflexible to the nontechnical user. However, one concern Curnin has is whether IBM's pricing will be so aggressive it will tolerate losing money on the color graphics portion of its business in order to maintain its user base.

# Graphics Mart Expected to Hit $4.5 Billion, Business Sector to Have Highest Growth

| Application | $ Value | Market Share | 1980-85 Growth |
|---|---|---|---|
| Mechanical Design (CAD/CAM) | $1,600 M | 39% | 36% |
| Electronic Design | $ 790 M | 19% | 17% |
| Business Graphics | $ 600 M | 15% | 52% |
| Drafting and Cartography | $ 290 M | 7% | 8% |
| Control and Scientific | $ 200 M | 5% | 10% |
| Animation and Art | $ 45 M | 1% | 10% |
| Other Applications | $ 540 M | 14% | 14% |
| TOTAL | $4,065 M | 100% | 24% |

Source: Strategic Business Systems, Inc.

**Graphics Application Growth**

SAN JOSE, Calif. — By 1985 the graphics market will have total yearly revenues of between $4 billion and $4.5 billion.

While the traditional computer-aided design and manufacturing (CAD/CAM) sectors will gobble up some 39% of the revenue, between now and 1985 the business graphics sector will be the fastest growing market — forging ahead at a 52% annual growth rate, according to Strategic Business Services, Inc. (see box above).

By 1985 business graphics will capture 15% of the total market, reaping annual sales of about $600 million, Strategic noted. Today there are more than 200 suppliers of computer graphics products, with nearly half of these companies formed in the last five years.

However, only a small proportion of these firms are orienting their products primarily to the business graphics market. Tektronix, Inc., with an estimated 87% unit share of the traditional vector graphics display market, does produce some terminals adapted for the business graphics environment, but the firm has stated it will remain in its traditional scientific-oriented niche.

Because the demand for traditional graphics products is so healthy, firms servicing these markets do not have to diversify into the business graphics arena. It's a seller's market now, Strategic concluded.

The two fastest growing companies in the graphics turnkey systems arena, Computervision Corp. and Applicon, Inc., have grown at about 80% annually in recent years and have minimal interest in business graphics products.

Propelling the demand for business graphics is sharply lower costs for color raster displays and four-color plotters. These reductions have removed the cost-of-hardware obstacle for many users.

Color capability is by far the strongest attraction of business graphics. Color allows the effective and simple display of complex business data, thus providing information in an easily digestible form.

The acceptance of business graphics is also being eased by the emphasis on this segment by firms such as IBM and Hewlett-Packard Co.

### Software Inhibition

At the same time, the market is inhibited by the lack of software. In many cases where software is available it is generally not very user-friendly. Primary users of business graphics are managers, who are usually not technically oriented.

Strategic recently performed a survey of users with business graphics installations. The survey found top management reporting accounted for 50% of the graphics usage, with financial and operational analyses making up 42% of the applications, marketing and sales 25% and planning and forecasting 8%.

Half of the installations surveyed use the services of a time-sharing network, while 40% used in-house IBM mainframe support for graphics applications. The remaining installations largely used Digital Equipment Corp. CPUS and HP 3000s.

The use of minis for business graphics applications was limited because these systems do not have access to the large data bases that are maintained for these installations.

Today, financial institutions represent the largest business graphics applications group. Banks, stock brokerages, investment houses and insurance firms have been pioneers in the use of business graphics.

Besides overcoming the lack of user-friendly software, Strategic pointed out, vendors today are now technology- rather than applications-oriented. Another major inhibiting factor in the marketplace is the structure of data bases that do not now easily permit graphics software input.

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# AT&T Requests FCC Approval Of 16.4% Private-Line Rate Hike

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — AT&T has asked the Federal Communications Commission (FCC) to OK a 16.4% increase in the company's private-line rates. The increase — which would add $233 million to users' bills this year — could become effective May 14.

The new rates were filed after the FCC adopted a revised cost allocation scheme last December, that, in the company's words, "substantially increased the level of costs allocated to private-line services." If the increase is approved, it will enable AT&T to earn a 10.5% rate of return on those services in 1981.

AT&T added that the rate increase applies to "most of the services included in the private line ... category." Generally, the only ones not included are those for which rates designed to produce a 10.5% rate of return already have been filed.

Whether the new tariff will be implemented in its present form is doubtful, however. Aside from user objections, the proposed rates will be affected by two other ongoing FCC proceedings. One is aimed at determining what AT&T's rate of return should be, the other involves restructure of the company's private-line services.

An FCC decision in the latter proceeding (Docket 79-246) is likely later this year. Afterward, rates for individual services will be "examined and adjusted," the company said. Earlier this month, an FCC administrative law judge, in an initial decision, said AT&T's present authorized rate of return, 10.5%, should be increased to 10.87%. The company wants 13%, however, and has already stated that it will try to get the decision modified.

## Telpak Continues To Existing Users

WASHINGTON, D.C. — Telpak service will continue to existing users indefinitely, after the latest court action in the battle between AT&T, users and competitors — a battle which started 20 years ago this month.

The U.S. Court of Appeals for the District of Columbia, in response to an appeal by the Department of Justice, ordered the existing service continued until the U.S. Supreme Court decides whether Telpak should be terminated.

The current phase of the battle involves the question of whether Telpak users are entitled to judicial review of 1977 Federal Communications Commission (FCC)order allowing AT&T to end Telpak. While this question was pending before the appeals court, service continued to existing Telpak customers. But last November, the court decided the users had not exhausted their administrative remedies at the commission. The FCC's 1977 order then became effective; but in response to pleas from the users, whose communications costs will increase by multiple millions of dollars annually if Telpak ends, the appeals court allowed service to continue while petitions to the Supreme Court were prepared.

According to attorneys for Aeronautical Radio, Inc. and the Air Transport Association. — two major Telpak customers — if the Supreme Court fails to reverse last November's appeals court ruling, Wats users may suffer as well as Telpak users.

"If AT&T should choose to eliminate its Wats offering," they told the high court, "the FCC's orders and the court of appeals' decision in this case ... could preclude any effective relief for aggrieved Wats customers." The attorneys indicated that cancellation of Wats is a possibility in view of opposition — from users as well as the FCC — to some features of a revised Wats tariff the phone company filed last November.

# Datacomm Briefs

## Western Union Accuses Telex Rivals

WASHINGTON, D.C. — U.S. International record carriers (IRC) are illegally giving away terminals to domestic users of their international telex services and unfairly underpricing the domestic access circuits, a top executive of Western Union said here last week.

Board Chairman Robert M. Flanagan lambasted the IRCs at a Senate communications subcommittee hearing on legislation that would repeal Section 222 of the Communications Act and allow the telegraph company to offer international communications services.

One of his key points was that, as a result of Federal Communications Commission (FCC) actions last year, the IRCs have been allowed to enter Western Union's domestic market, but the telegraph company has not been given the reciprocal right to compete with the international carriers on their turf.

He was referring to Commission actions late last year allowing the IRCs to terminate their international services in 26 additional U.S. cities. The commission also permitted Western Union to expand its network overseas, but this change was later struck down by the U.S. Court of Appeals, which said that it was forbidden by Section 222.

As a result, Flanagan said, Western Union lost 10% of its domestic landline traffic by the end of 1980. By the end of this year, he added, "we will have lost 40% of the outbound traffic and 35% of the parallel incoming business."

The IRC's success is due partly to the fact that they do not charge the customer for domestic access, Flanagan contended. "Since Western Union is permitted to participate in only the domestic portion of the service, we can't give away the domestic haul and make it up through the international charges like the IRCs can." As a result, "a customer in Milwaukee using Western Union to take his overseas message to an IRC in New York would have to pay at least 45 cents a minute on top of the IRCs' full international rate."

Another reason for the telegraph company's recent loss of telex traffic is that "the IRCs are giving away teleprinters in their new points of operation free of charge," Flanagan charged.

# Nixdorf Plans Operating System for IBM 4300

RICHMOND, Va. — Nixdorf Computer Software Co. (NCSC) has announced plans to release a new operating system for IBM 4300 processors.

Edos/VSE 2.0 was designed for 4300-type processors running in both Extended Control Program Support (ECPS) and 370 modes, the firm said. The system will not operate in an IBM 360 mode.

Based on IBM's DOS/VSE Release 35, the NCSC system features extended procedure language (EPL), support for count-key-data and fixed-block architecture devices; direct access storage device channel switching and extended spooling facility (ESF).

The EPL and ESF features provide improvement to facilities offered on IBM's DOS/VSE operating system, the firm maintained.

The EPL has an intelligent language capability that improves job control language processing by providing conditional execution facilities and job stream testing without user program execution.

A procedure testing facility allows the user to obtain a complete printed analysis of all conditions presented for the entire procedure, the vendor said. Other EPL features include backward branching within a procedure, user program interface, symbolic keywords and an enhanced display utility program.

The ESF facility of Edos/VSE 2.0 provides user-oriented enhancements to permit additional specifications of priorities, page separators and general output control in user JCL.

The extended console support facility (Econ) allows console spooling and continuous operation while awaiting operator responses. Econ, combined with NCSC's program development and maintenance system works to create interactive work stations under Edos/VSE 2.0, a spokesman explained.

Features currently available on NCSC's Edos/VS 1.2 will be found in Edos/VSE 2.0. These include 12-partition support, automatic IPL, enhanced logical transient area scheduling and automatic priority balancing.

NCSC's current operating systems include Edos/VS 1.2 and Edos 5.6, designed to run on IBM 360 and 370 systems.

The new operating system is scheduled for alpha testing by the second half of 1981 and will be in beta test by December, the spokesman said.

Edos/VSE 2.0 will be released for general use in the first quarter of 1982. The firm has not yet set a price for the product, but expects to do so this summer. In general NCSC's compatible operating systems are priced comparably with IBM's products, the spokesman said.

The vendor is located at 6517 Everglade Drive, Richmond, Va. 23225.

## Spelling Check Added to DOSF

WHITE PLAINS, N.Y. — IBM has added a spelling check capability to its Distributed Office Support Facility (DOSF) for 8100 systems.

DOSF expands the data processing capability to include word and text processing functions. The enhancement, called DOSF Release 2, adds a user-expandable vocabulary of about 170,000 medical, legal and general usage English words. Release 2 also includes a spelling assistance capability that can supply users with the likely correct spelling of misspelled words.

Release 2 also offers a records processing feature that allows documents that contain structured data (text-created files) such as lists and tables to be processed and sorted.

Other features include a text arithmetic feature, mass mailing functions and an alternate working store.

IBM has also added additional printer support under Release 2. Users can now specify drawer selection for printers with a multiple sheet feed capacity (such as IBM's 6670 information distributor).

IBM also introduced a DOSF installation/configuration facility effective with Release 2 of the DPCX operating system and DOSF Release 1.

The monthly license fee for DOSF with the enhancements is $496 for the basic license and $372 for the distributed systems license option (DSLO).

Prerequisites for DOSF are at least one 8100 processor running the DPCX operating system Release 2. The minimum processor storage for DOSF/DPCX is 512K bytes. Also required is one 3732 text display station attached via the Printer Attachment feature. Minimum memory requirements for DSOF are 90K bytes of real storage and 4M bytes of disk space.


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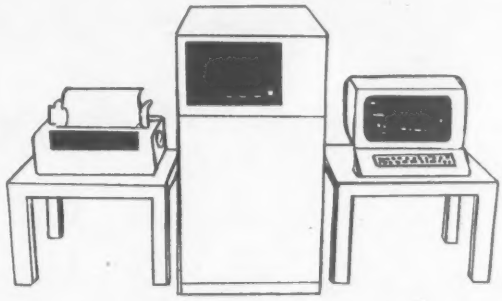

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## *Amid FCC, User Objections*

# Bell Proposes Revised Rate Schedule for Wats

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Another major change in Wats rates has been proposed by AT&T, but whether it will answer objections raised by the Federal Communications Commission (FCC) and Wats users is doubtful.

Last fall, the phone company replaced Full Business Day (FBD) and Measured Time (MT) discounts for both outward Wats and 800 service (Inward Wats) with a "tapered rate schedule" [CW, Sept. 22].

The FCC then said the company also would have to grant discounts for Wats calls made during nonbusiness hours [CW, Jan.12]. The effective date of the proposed Wats tariff was suspended for five months, until June 1, 1981, to give AT&T and users time to propose alternative off-peak pricing schemes.

The phone company disclosed its plans early last week. It is essentially offering discounts of 35% to 57% for Outward Wats calls made during the evening hours — 5 p.m. to 11 p.m. during weekdays, 8 a.m. to 5 p.m. on Saturdays and Sundays. The amount of this discount would depend on the customer's peak period usage.

There is also a 65% reduction, regardless of usage, for calls made between 11 p.m. and 8 a.m. during the week or on weekends.

In all cases, the discounts are based on a revised schedule of charges for peak period Outward Wats service. The rates proposed last fall have been reduced 11% to 34% for customers whose average usage per line amounts to 16 or more hours per month.

### Tapered Schedule

Under last fall's tapered rate schedule, an Outward Wats customer whose traffic per line averages more than 140 hours monthly paid less per hour than one who made 81 to 140 hours of calls. Under the new scheme, this rate differential is eliminated. Thus, although the heaviest users of Outward Wats have been granted a hefty discount, it will — if the tariff is approved — be based on a higher hourly rate than the one AT&T proposed last fall.

For 800 service, a similar off-peak price structure was proposed. Discounts for evening usage would range from 28% to 47% and would amount to 52% for the 11 p.m. to 8 a.m. period.

The newly structured peak period rates are 9% to 27% lower than the ones proposed last fall for 16 hours or more of use per month.

Although AT&T said the newly proposed rates are designed to comply with FCC objections, the commission has proposed a vastly different off-peak pricing scheme.

Another likely source of controversy is the Wats user community. As AT&T pointed out, "some heavy users who do not take advantage of the new discount periods could pay more."

This point was underlined in two filings that arrived at the FCC concurrently with AT&T's new Wats tariff.

One filing came from the Tele-Communications Association, which represents 471 telecommunications users, many of whom lease Wats circuits. The Ad Hoc Telecommunications Users Committee — representing 14 of the nation's major corporations, and biggest Wats users — submitted the other filing.

Both groups contended that it is impractical for them to exploit off-peak outward Wats rates because this would require a drastic restructuring of their present office hours.


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# Bad Tidings in Store for Federal Meet Attendees

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Government DPers who attend a federal information systems conference here next month will hear a particularly bleak assessment of federal information management.

"Something is terribly wrong with federal government computer operations," according to Robert V. Head, of the Brookings Institution, who will present findings of his study of federal information systems management.

*'Given the size and complexity of federal information systems, solutions must be found before malfunctioning, error-prone and fraud-susceptible systems produce a managerial disaster of the first magnitude. The warning signs are unmistakable and the danger signals are flying.'*

"Given the size and complexity of federal information systems, solutions must be found before malfunctioning, error-prone and fraud-susceptible systems produce a managerial disaster of the first magnitude. The warning signs are unmistakable and the danger signals are flying," Head reported in a paper detailing preliminary results of the study.

With an installed base of over 15,000 computers, a workforce of more than 100,000 computer specialists and a budget exceeding $5 billion per year, according to Brookings figures, federal DP faces problems "enormous in scope and elusive of easy solution."

The Brookings study, which will result in a report published later this year, will propose a set of remedies to the special needs of federal DP managers.

Head, a federal executive fellow at the institution, will discuss the study during a session of the Federal Information Systems Conference, set for here March 30-April 1. Head is serving as conference chairman.

### Wiley to Keynote

The conference keynote address will be delivered by former Federal Communications Commission Chairman Richard E. Wiley, who was a member of the Reagan transition team. Also scheduled are presentations by high-level General Services Administration and General Accounting Office officials.

Rep. Frank Horton (R-N.Y.), cosponsor of the recently enacted Paperwork Reduction Act of 1980, will be a featured speaker. Implementation of the paperwork law, which reorganized federal information management, will be a major topic of discussion at the conference, according to conference organizers.

Program and registration information can be obtained from U.S. Professional Development Institute, 12611 Davan Drive, Silver Spring, Md. 20904.

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## Software Meet To Feature First 'Tools Fair'

SAN DIEGO — The Fifth International Conference on Software Engineering will be held here March 9-12. The program is being jointly sponsored by the Association for Computing Machinery (ACM), the National Bureau of Standards (NBS), and the Institute of Electrical and Electronic Engineers (IEEE) Computer Society.

A first-of-its-kind "Tools Fair" will be on display at this event, and a previously unannounced full-day tutorial combines to make the conference of special interest to those involved in program design and system development. The additional tutorial is entitled "An Intelligent Layman's Guide to Computers," and spouses as well as participants are invited.

Tutorial costs vary, depending on society membership and registration dates. Complete details are available from conference coordinators at the IEEE Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

*Demonstration Sites in Works*

# Univac Plans Bracket Systems for 1100 Series

By Jeffry Beeler
CW West Coast Bureau

SANTA CLARA, Calif. — Sperry Univac plans to bracket its 1100 series of large-scale mainframes with at least two additional models, according to Frank Holst, the company's vice-president of program management.

One of the expected processors will be an entry-level addition to Univac's 1100/60 systems family, while the other future offering will be an upward extension of the 1100/80 series, Holst said recently at a Sperry Corp. meeting for West Coast financial analysts.

Most, if not all, of the planned additions to Univac's large-scale processor family are apparently already under development, although Holst declined to say exactly when the systems would make their formal debuts.

The company is also readying additional models for its medium and small-scale mainframe lines, according to Univac President Richard Gehring.

### Follow-on Generations

In fact, the firm is currently developing at least two follow-on generations of systems for each of its three main processor classes, Gehring said at the same security analysts meeting, which took place at Univac's Information Storage Systems Division here.

For the company's recently announced System 80, which boasts roughly the same level of computing power as an IBM System/38, Univac plans eventually to provide additional I/O equipment, including high-capacity disk systems, streaming tape units and high-speed impact printers. The vendor also seeks to achieve object code compatibility for all its OS/3 users and to provide an upgrade path for customers of its Model 90/30 medium-scale processor, Holst said.

On the small-scale systems front, Univac intends ultimately to enhance its existing V77 minicomputer line with additional peripherals, including a floppy disk subsystem, fixed disk system and improved display terminals. The firms also plans to expand the V77's communications capability to permit the family to accept additional models of terminals and host processors, Holst said.

In an address that offered a rare glimpse into the usually tight-lipped company's product plans, Gehring underscored Univac's intention to expand its range of application packages and improve the functionality of its operating systems. The firm's efforts to increase its software functionality will particularly stress matters like data security, systems recovery and machine-independent packages, Holst said.

During the coming year, Univac also plans to open a world-wide network of 54 product demonstration sites similar in function to the Business Computer Centers IBM recently established to spur sales of its 5100 series machines and other small business systems.

Dubbed the Advanced Centers for Customer Education, Service and Support (Access), the sites will aid user training and allow Univac salesmen to conduct "hands on" demonstrations of the firm's System 80 and similar processors. In theory, the Access sites will also serve as a gathering place for large numbers of prospective buyers and thus minimize the overhead of selling Univac's lowest priced business systems, according to Glen Haney, the company's worldwide marketing vice-president.

On the peripherals side of its operation, meanwhile, the firm seeks eventually to introduce additional terminals that offer:

- Better price/performance than their predecessors.
- Color graphics capability for business applications.
- Interfaces for both IBM's System Network Architecture and packet-switched networks.

The company is also considering the possibility of customizing some of its terminals.

## Correction

In the recent "Update on 'H' " [CW, Feb. 9], Amdahl Corp.'s 580-5880 processor was identified as a uniprocessor; the CPU is actually a dual processor. In addition, while the 5880 currently offers only 32M bytes of main memory and 36 channels, an Amdahl spokesman said more main memory channels will be announced.


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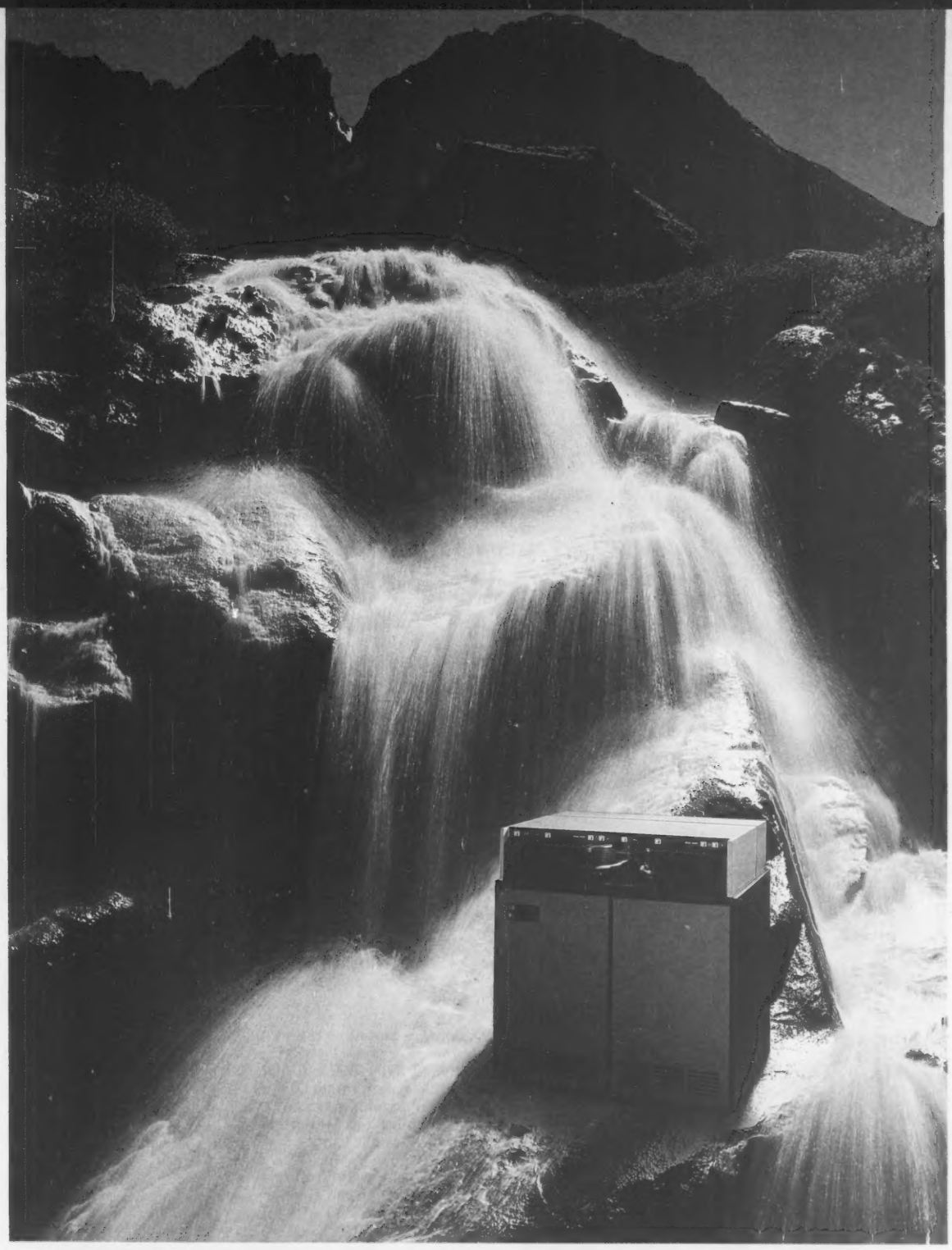

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# Credit Card Listing Services: Are They Secure?

By Lois Paul
CW Staff

For an average fee of $12 per year, a consumer can list all of his credit cards with a number of services across the country that will maintain the information on computers in the event of the loss of theft of the customer's cards.

What actually happens to that information after it is recorded is difficult to determine. Security is tight — so tight, in fact, that no one seems willing to talk about it.

Standard services include credit card registration; a toll-free number members can call if cards are lost or stolen; notification of all card issuers, generally within 24 hours; automatic requests for replacement cards; theft-deterrent labels identifying cardholders as members of the particular service; change of address notification; and emergency cash and airline tickets for members stranded away from home when cards are lost or stolen.

Montgomery Ward's Credit Card Security Service, which is located in Chicago, provides these basic services for 500,000 members who pay a $12 annual fee, according to manager Karen Rivette. The information is computerized, she said, but declined to comment further regarding the equipment used because she felt this information would be "classified."

"When a person calls, he has to give us certain security information, such as a mother's maiden name. We will not, under any circumstances, change anything without that security information," Rivette said.

Generally, if credit cards are lost or stolen, users may be liable for the first $50 illegally charged to their accounts. With Montgomery Ward's service, "They don't have to worry about the $50 liability," Rivette said. "We notify all their credit card companies within 24 hours, get them new cards and send backup letters to the companies."

### Safecard Services

Another three million subscribers pay an annual fee of $12 for membership in Safecard Services of Fort Lauderdale, Fla. According to Peter Halmos, chairman of the board of Safecard, the service operates through an on-line, real-time, in-house computer system.

"There are many precautions built into not only the security of the system, but access to it and so on," Halmos said. "My telling about them would defeat the purpose of having them."

He added, "We have been in business for 11 years and we haven't had any problems."

Safecard handles the Hotline credit card listing service offered by Mobil Oil Corp., which has between 100,000 and 200,000 members. A spokesman for Mobil preferred keeping the actual figure confidential "since it is proprietary information for us."

Questioned about Safecard's refusal to discuss security measures, even in general terms, the Mobil spokesman said this secrecy probably stemmed from the fact that it is a very competitive business."

Over one million people subscribe to Credit Card Service Bureau (CCSB) in Alexandria, Va., and pay the annual $12 fee. Robert Holtje, vice-president of marketing services for CCSB, said, "Information on security measures is confidential."

### American Express

American Express Co. uses CCSB as the vendor of its listing service. "We basically had CCSB develop a program specifically for our card-members," Nancy Muller, manager of public affairs, explained. The service costs $9 per year, and 106,000 American Express cardholders have joined since it was first offered in the fall of 1979.

On the topic of security, Muller said, "We keep security information on file with CCSB. There is no change of address, for example, unless the person gives certain security information that was on the application — that is, information that a person stealing their cards wouldn't know. In this way, we verify their identity."

She said certain CCSB employees handle only American Express card members. The credit card listing service numbers are kept completely separate from card-members' American Express account numbers, she added.

Another spokesman for American Express indicated that there is "state-of-the-art security." The computers storing the card information are kept in a separate building and employees working with the data are carefully screened. Cardholder lists are "salted" to conduct periodic checks on security, he said.

These are typical security precautions taken by companies dealing with computerized credit card information, according to a source who spent five years working with this type of organization. "There are membership code numbers which are used each time someone calls for information," she said, adding that each operator who works with the files has another individual code number. "It is impossible to get into the computer without the correct digits," she explained.

"Only certain people are authorized to make any changes to files," she said, noting that periodic audits are another precaution. "If an operator made a change, it shows up at this time." From her experience, she said, "To break into a system, you would have to be working inside."


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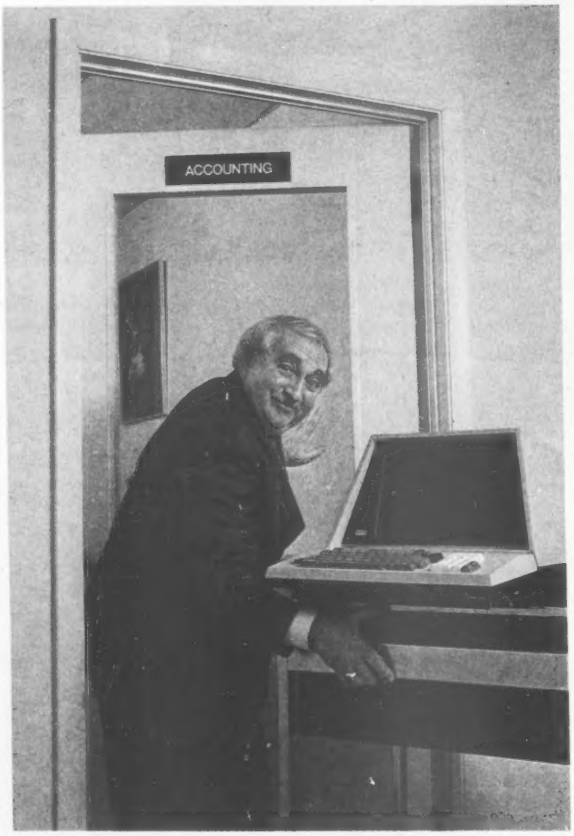


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*USPS Also Exploring Electronic V-Mail*

# Intelpost Expansion Expected in Two Months

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Intelpost will be expanded "within the next month or two" to the Netherlands and possibly other European countries, Postmaster General William F. Bolger said here earlier this month. He also disclosed that the U.S. Postal Service (USPS) is "exploring the possibility" of offering an "electronic V-mail" service to U.S. military personnel stationed abroad.

Intelpost, the facsimile-based electronic message system USPS began last fall, now provides two-way service between the U.S., Canada and the UK. A number of commercial communications carriers offer competing services.

The plans for Intelpost were disclosed during a question-and-answer session after Bolger addressed the National Press Club. In his prepared remarks, the postmaster general lashed out at union leaders for allegedly excessive wage demands and at the U.S. Postal Rate Commission for objecting to a proposed five-cent increase in the present 15-cent first class mail rate.

If the unions try to win a better settlement by calling a strike, "I will not hesitate to suspend the Private Express Statutes and exercise other options available to me under the law," Bolger said. And if the rate commission continues its opposition, USPS will support proposals "in Congress and by the new administration's transition team" to abolish the commission.

If the U.S. is to continue enjoying what Bolger characterized as the world's most cost-effective mail service, USPS must be free to exploit automation, he said. It has been the major factor responsible for lopping 74,000 workers off the agency's payroll between 1970 and 1980. During this same period, according to Bolger, the amount of mail handled by the postal service rose more than 20%.

The only way to obtain further improvement, he added, is through additional automation, "and that is where the Zip-Plus-Four (nine-digit Zip Code) comes in."

Many business firms that employ computerized addressing systems object to the new code because of the software changes it will require. Meanwhile, commercial vendors of electronic message services are fighting another postal service initiative based on use of the computer.

Early next year, the agency is scheduled to begin Electronic Computer-Originated Mail (Ecom), a service enabling mass mailers to transmit letters on-line to delivery post offices in the nation's 25 largest cities. The next phase of the Ecom battle is imminent.

Shortly before Bolger spoke at the press club, the General Accounting Office published a study predicting that private electronic message services will be carrying 28.3 billion pieces of mail annually by the year 2000 and will cut the postal service down to a shadow of its present size. The study was commissioned by a subcommittee of the House Post Office committee.

## Seminar to Cover Internal Controls

ST. PAUL, Minn. — The Canadian Institute of Chartered Accountants (CICA) will be conducting "Computer Controls," a three-day seminar to be offered in several locations this spring.

The program is recommended for information processing personnel, financial management and internal and external auditors. It can be taken at any one of the following locations: Chicago, March 2-4; San Francisco, April 6-8; Philadelphia, March 4-6; and here, June 1-3.

The seminar costs $495 per person. Additional information can be obtained from Stephanie Gaubatz at RHY Consultants, Inc., P.O. Box 21026, St. Paul, Minn. 55121.

## Staats to Speak At Office Expo

WASHINGTON, D.C. — U.S. Comptroller General Elmer Staats heads the list of more than 85 speakers participating in the conference segment of the 1981 Federal Office System Expo, which will be held here March 16-18. The conference is being conducted by National Trade Productions, Inc.

Information management will be covered in more than 40 sessions also being offered at the three-day event.

Three different registration plans are available, along with a detailed conference agenda, from the conference sponsor, National Trade Productions, Inc., Suite 300, 9301 Annapolis Road, Lanham, Md. 20301.

## Correction

Computacion '81, the Latin American computer show, set for Feb. 24-27 in Mexico City, will take place in the U.S. Trade Center, not in the Hotel Continental as originally publicized. The need for more exhibit space was the reason given for the change in plans.


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# Managers on the Move

Janet Green

Arnold Casinghino

William S. Landis

JANET GREEN has been appointed vice-president of Monchik-Weber Investment Systems, a Boston-based division of The Monchik-Weber Corp. Green will be in charge of customizing the firm's international portfolio accounting systems for banks and mutual funds in Europe and abroad.

Green has been involved in a wide range of projects at Monchik-Weber, including the development of portfolio accounting systems on the IBM System/34. She was also the systems analyst responsible for the accounting system for a major offshore investment management firm, and worked as project manager in charge of modifications and enhancements for another system designed for a mutual fund investment management outfit in Baltimore.

Prior to joining Monchik-Weber, Green worked for Delphi Associates, a subsidiary of Arthur D. Little, and at Electronic Data Systems Corp. on health care and banking system applications. She earned her B.S. degree in mathematics from Simmons College.

• • •

ARNOLD CASINGHINO has been named vice-president, technical support, Management Information Systems, at The Connecticut Bank and Trust Co. in Hartford, Conn.

Casinghino joined the bank in 1971 and became operating systems project leader in 1977. He is currently operating systems support manager in charge of the IBM operating system and associated software. He is also the company's official representative in Share, the national IBM users group.

A graduate of Boston University, Casinghino holds an A.B. degree in history.

• • •

WILLIAM S. LANDIS, computer operations manager of Bethlehem Steel Corp.'s accounting department, recently retired from that post after 41 years of service.

Landis came to the company in 1939 after graduating from Allentown Business College, now Allentown Business School. After filling several supervisory positions, Landis advanced to sub section head in the billing division. He became assistant section head in 1954 and then section head in 1965. In 1968 he was promoted to operating systems supervisor, and one year later was appointed assistant manager, computer data processing, where he assumed his most recent post.

• • •

RONALD LANDAU has been named corporate vice-president and director of MIS at United Merchants and Manufacturers, Inc.

Landau joined United Merchants in 1968. For the past two years, he served as director of MIS.

Landau is a graduate of Cornell University.

• • •

ROBERT F. HARGRAVES JR. has recently been appointed a vice-president of Metropolitan Life Insurance Co. with the responsibilities for the development of information service business opportunities.

Prior to joining Metropolitan, Hargraves was president of DTSS, Inc., the Hanover, N.H., service and software firm.

He was also a developer of the Dartmouth Time-Sharing Systems and founder of DTSS, Inc.

Hargraves holds an A.B. in mathematics from Dartmouth and a Ph.D. in physics from Brown University.

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# Managers on the Move

Howard Melton

Jay S. Stone

Charles Chasney, Jr.

HOWARD MELTON has been appointed director of data processing for Wometco Enterprises, Inc., Miami.

In his new position, Melton will be responsible for computerized systems for Wometco's bottling and cable television divisions, as well as corporate accounting functions and computer operations. In 1968, Melton joined Wometco as a programmer/analyst. He attended Virginia Polytechnic Institute and is a member of the Data Processing Management Association.

•••

JAY S. STONE has recently been promoted data processing manager of Symons Corp. in Des Plaines, Ill. Now reporting to the controller, Stone will have responsibility for all computer operations and programming for the firm, which designs and manufactures concrete forming systems.

Prior to joining Symons, Stone accrued over 13 years' experience in the information processing field with various industrial outfits. His background includes programming, systems analysis, operations and departmental management.

Stone received a B.A. from the University of Chicago and an M.B.A. from the University of Chicago Graduate School of Business. He is a part-time instructor at William Rainey Harper College in Palatine, Ill.

•••

CHARLES CHASNEY JR. has recently been named director of property and casualty systems development for National Grange Mutual Insurance Co. in Keene, N.H. In the newly created position, Chasney will head up all DP systems, programming functions and application systems.

Chasney brings to this position more than 10 years of DP experience. He comes to National from the Automobile Club of Michigan where he worked as manager of systems development.

A native of Michigan, Chasney attended the Lawrence Institute of Technology in Springfield, Mich., and served two years in the U.S. Marine Corps.

•••

MARY STROUSE has been appointed manager of systems and programming of Petroleum Data Corp. in Princeton, N.J. Previously, she had been a consultant to Petrodata on systems and procedures for the company's on-line computer service.

Strouse is now responsible for the preparation of all new software enhancements, as well as maintenance of existing system and application software in her new position.

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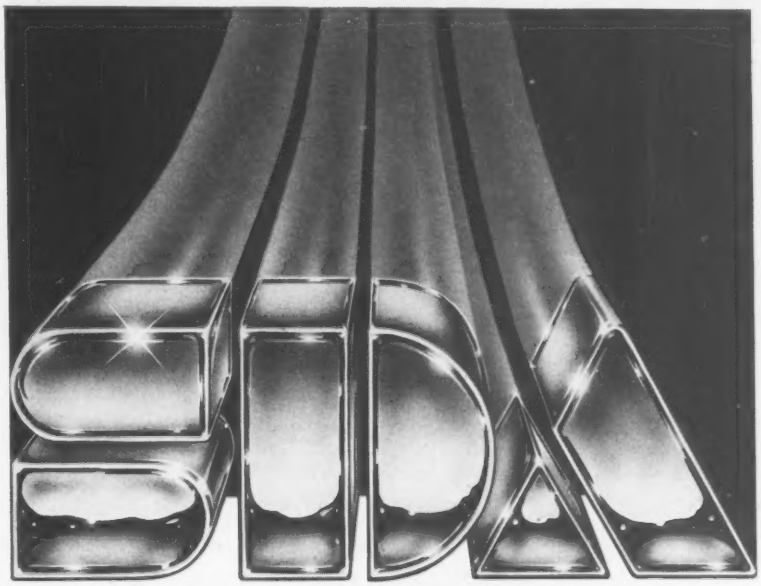


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*Reagan Officials Take Notice*

# Pilots Cancel Walkout After Grievance Meeting

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — A walkout by the Air Line Pilots Association (Alpa) — planned to protest Federal Aviation Administration (FAA) policy on such issues as the allegedly antiquated computerized air traffic control system — has been averted through negotiations with Reagan administration officials.

The one- to three-day walkout was tentatively scheduled for March 2, two weeks before a rumored air traffic controllers union strike [CW, Oct. 13, Oct. 20], and would have reinforced a number of the complaints voiced by the Professional Air Traffic Controllers Organization (Patco) against the FAA.

The action was called off as a result of a recent meeting between Alpa's executive board and Department of Transportation Secretary Drew Lewis, in which the secretary expressed willingness to work with airline pilots in their aviation safety concerns.

### Examination Warranted

At the meeting, Lewis said that the seriousness of the air safety issues raised by pilots in their planned Operation USA (Utility for Safe Air Travel) walkout and public-awareness campaign warranted an effort by the new administration to examine these issues as soon as possible, an Alpa spokesman reported.

The issues leading up to the aborted walkout were and are safety-related, according to pilot Gene Kragness, national publicity coordinator for Operation USA and Alpa spokesman. "In a broad sense it was mismanagement by the FAA that brought this on on the one hand and inaction on the part of the FAA on the other hand."

For example, the computer-based air traffic control system "is antiquated and not as dependable as it should be," Kragness said.

"It is not as dependable as the state-of-the-art can provide for [the controllers]. The air traffic controllers have long complained of the inadequacies of the system they're now working with," he noted, adding the FAA "has grudgingly admitted that there are problems, namely, an unacceptable number of system errors, or failure of the computer to function."

While the FAA has stated its intention to replace the existing computer system, Kragness noted, "again, we're looking at the end of the decade before this replacement has been fully implemented. We think this timetable could be greatly accelerated."

### Airborne System

Tied into the reportedly troubled computerized radar system would be the FAA's planned ground-based collision avoidance system — another bone of contention between Alpa and the agency.

Alpa believes a microcomputer-based airborne system would be more reliable and available sooner. "Again, the hardware is available to provide an airborne collision avoidance system that would reliably assist pilots in avoiding other aircraft," Kragness charged.

"We had 537 near-misses reported in the year 1980," he pointed out. "A near-miss is a near-collision, really; it's two aircraft coming in dangerous proximity; it's a breakdown in the system.

"We're not talking about any great leap in technology. This is at hand; this could be fully implemented within 18 months."

Not only would the airborne system be usable sooner than the ground-based system, but it would also give pilots more explicit commands for avoiding approaching aircraft, Kragness claimed.

"The FAA system is one that would provide commands to the pilot only of an 'up' and 'down' nature, whereas what we know is available could give us the most expeditious route of escape from the imminent danger of collision," he said, explaining that would include "left, right, up and down."

While Alpa is not asking the FAA to employ a specific computer system or software program, Kragness emphasized, "We're looking for a commitment on the part of this administration to first of all recognize that there is a glaring deficiency here and, secondly, commit itself to redirecting the FAA to look at these problems instead of sidestepping the issues."

Other concerns of the 33,000-member organization include the issue of aircraft certification, Kragness explained. "The FAA has a mandate through the Aviation Act of 1958, as amended, which clearly allows the FAA to include interested and qualified third persons in the certification process of new aircraft."

The FAA has to date ignored Alpa's request to be included in the process and "instead the certification process takes place behind closed doors, with only the FAA representatives and manufacturers in attendance," he added.

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# Medical Bills Lost in Blue Cross Conversion

By Bill Laberis
CW Staff

DALLAS — Scores of medical bills disappeared after being entered on a newly computerized claims processing system last year, causing up to six-month payment delays, according to hospital administrators and consumer protection officials here.

But spokesmen for Blue Cross and Blue Shield of Texas have refused to comment on the cause of the reportedly extensive problems that developed when it switched to a fully computerized claims operation.

The company also refused to say whether alleged computer malfunctions beginning late in 1979 and continuing through May 1980 could have been avoided, even though the problems have apparently been rectified.

A spokesman for Electronic Data Systems Federal Corp. (EDSF) of Dallas, the DP subcontractor providing facilities management for Blue Cross, also declined to comment on the situation.

He instead referred all inquiries to the Blue Cross office because of what he termed "a contractual obligation with the company," saying only that the claims situation "was not a computer problem."

What Blue Cross spokesman James Crawford did release was a prepared statement outlining the company's reported excellent performance in turning over recently filed claims.

The statement did not mention or address the alleged problems which began when the fully automated and computerized processing system started up.

### Consumers Complain

The computerized claims processing system went online in September 1979, reportedly to expedite the handling of claims for Blue Cross' 1.5 million policy holders statewide.

By early 1980 it became apparent that the new system, or the staff operating it, was having problems, as consumer complaints began pouring into the Better Business Bureau of Metropolitan Dallas and to the State Insurance Board there.

"Some people complained they were waiting two and three months to get claims paid [by Blue Cross], with no luck collecting," said Ray Marek of the insurance board. "It seemed that lots of files input to the system in the early going were simply lost without a trace."

Marek said he was told the company was "straightening out some bugs within the new system" and that the problems were resolvable. He also said he felt "the original problem could have been avoided with better planning."

Complaints about Blue Cross to the board have since leveled off, but not as drastically as expected, Marek said.

When the Better Business Bureau asked Blue Cross for an explanation of a fourfold increase in consumer complaints about the company's claims processing, it was told the problems were "due to the computer."

"We were told also that there were some personnel problems there partly responsible for extreme delays in processing claims," said Ronald P. Berry, Dallas bureau president. "We have seen an improvement over last year, although I don't think we were ever told exactly what the problem was. I know we asked."

The backlog in processing claims became so acute that the company paid sizable lump sums to certain hospitals to alleviate cash flow problems there.

Baylor University Hospital, the state's largest, was sent a $500,000 advance from Blue Cross, a spokesman said.

"I was told that Blue Cross just had personnel inadequate to input claims," said Tom Morgan, director of business at St. Paul Hospital here.

"Their claim settlement period went from a standard of about four weeks up to four months and more. They really didn't iron out the problems until May or June of last year, and even then not completely."

But as one problem appears to be abating at Blue Cross, another potential pitfall looms on the horizon. The company has handled claims processing chores for the state Medicare program since the 1960s.


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# Securities Exchange System Set for Pilot Run

By Bill Laberis
CW Staff

TRUMBULL, Conn. — A computerized securities exchange system in line with a U.S. congressional mandate calling for a national stock market scheme will commence pilot operations within weeks.

The Computer-Assisted Execution (CAE) system is being touted as a big step toward the development of a national trading market, one designed to increase both the speed and efficiency of stock transactions. It was also designed to remove some of the influence of the fixed stock exchanges, where the vast majority of stock issues are now traded.

However, officials at the New York Stock Exchange (NYSE), the nation's largest, believe CAE will foster a more one-dimensional trading market than that created by its own floor traders. "It's a question of whether you want the master to be the computer or the buyers and sellers on the floor, all acting independently and autonomously," a NYSE spokesman said.

The National Association of Securities Dealers (Nasd), which created and will operate the $10 million system, said the NYSE can show its support for a national market system by installing CAE computer readouts on the exchange floor so that traders can sample market activity outside the exchange.

The NYSE board of directors has taken the cooperative suggestion under advisement, but has not formally ruled on whether it will comply with the Nasd request.

Once up and fully running, CAE will be a real-time, online stock inventory system accessed via more than 1,400 CRT terminals leased to 700 different traders. A buyer, for example, will type in his order request to Nasd's computer center here, then the system will scan its stock inventory, selecting the best price available for the desired purchase.

Stock sellers, meanwhile, can continuously access the system, raising or lowering the price of their offerings as the market changes with constant trading. All transactions and inquiries will take place in a matter of seconds, with complete and up-to-date market information available to any terminal operator, Nasd maintains.

Inventory control and market updates will be processed by Nasd's Sperry Univac 1100/22 CPU, supported by four Tandem Computers, Inc. 16 processors which will sort and feed messages to the mainframe "like a high-speed post office," a Nasd executive said.

Initially the system will process up to 20 messages per second, a capacity to be greatly upgraded when the system is fully operational, Nasd said.

### Exclusivity Rule

Virtually any stock now listed on the major stock exchanges can be included in CAE, according to Richard Justice, vice-president of Nasd. The major rub is that 1,400 of the nearly 1,600 stocks listed on the giant NYSE are subject to the exchange's Rule 390, commonly known as the exclusivity rule.

It requires exchange members, including all the securities' heavyweights such as Merrill Lynch, to do their buying and selling of exchange-listed stocks only on the exchange floor.

Rule 390 was criticized by the Securities and Exchange Commission for allegedly creating a monopoly situation for floor specialists trading their designated stocks.

Now a recent modification of the exclusivity rule, Rule 19C3, allows stocks issued after April 1979, to be traded by exchange members off the exchange floor.

"In our way of thinking, CAE will ensure that traders get the best deal available," Justice said.

The NYSE, on whose cooperation the success of a national market system may rest, feels differently.

"It's a matter of two different philosophies on how trading should be accomplished," said an exchange spokesman. "We are not opposed to computerization here. We do believe that the buyer/seller interface offers more flexibility in trading, whereas the computer creates a totally limit-order market."


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*Cost-Effective Hardware*

# Ohio Scientific Scores With Storage Options

By Hillel Segal
Special to CW

Reliable, cost-effective hardware with a wide range of storage options seemed to be the Ohio Scientific, Inc. C-3A's strongest suit in benchmark testing conducted for the Association of Computer Users (ACU).

The tests, a series of standard programs written in Basic and run by an independent consultant, seemed to uncover a weak spot in the operating system. The result was slower operation in one area of the testing series.

In the math-oriented scientific/-engineering problem, the C-3A's finishing time of 12 minutes, 10.7 seconds was an excellent performance for systems prices less than $15,000 in the ACU's Benchmark Series 1. That time also bettered the average for the costlier systems in Series 2, a group priced between $15,000 and $25,000. Results of that group were reported in *Computerworld* earlier this year.

The C3-A's scientific/engineering result came close to the mark set by North Star Computers, Inc.'s Horizon, which took what appeared to be a commanding lead in that test with a 12:01.9 performance. The North Star system achieved its result with the help of an optional floating-point processor module that speeds up arithmetic operations.

### Figure Revised

However, the North Star's leadership was undercut recently when revised figures became available for the Digital Equipment Corp. Decstation 78, which we discussed in an earlier column. At that time, we noted that our Decstation 78 benchmark results included both compile and run time.

Now, we are able to report the Decstation 78's run-only timings, a figure more applicable to every-day operation in an actual business. The revised times in our scorebox put DEC on top in the scientific/engineering problem.

Back to the subject of today's column — the Ohio Scientific system — and the accounts receivable problem. This test includes both arithmetic and diskette I/O operations (unlike the scientific/-engineering test, which does not use the disk). In the accounts receivable test, the Ohio Scientific system took a back seat to the rest of the field. It's time of 15:49.3 was the slowest result so far recorded in either price range.

A search for possible explanations turned up a significant clue. Peculiarities of the operating system appeared to contribute to the slow accounts receivable result. It seemed that optimization of the program could be attempted by performing within the application program some functions normally thought of as part of a more sophisticated operating system.

Our suspicion that the relatively poor accounts receivable performance of the Ohio Scientific C3-A is related to the operating system comes from some characteristics of the software design. Many of the system commands are in actuality Basic programs that must be interpreted and executed as the system runs.

In addition, certain actions on the part of an application program must be accomplished by interacting directly with the operating system on a machine language level, changing the values in absolute memory locations. This is done through PEEK and POKE commands, a process that forces the programmer into direct interaction with an element of the system which, in more advanced operating systems, is transparent to the programmer.

It would appear that sophisticated programming could have speeded up the run time of the accounts receivable program.

However, the use of PEEK and POKE, direct disk addressing and I/O buffer management would be required to do this. Considerable knowledge of operating systems techniques and the specifics of the C3-A would be required, putting such an attempt beyond the scope of our benchmark testing process.

On the plus side, the C3-A's operating system does offer expandibility to multiuser applications. In some cases, this could be a considerable advantage.

### Storage Options

The C3-A system we tested cost $10,440 and included 48K bytes of memory two 8-in. single-sided floppy disks, a Hazeltine Corp. 1420 terminal, and a 160 line/min Okidata Corp. 22 printer. Less expensive printers are also available for the system. The C3-A includes three different microprocessors, of which the 6502A is the one used by the Basic interpreter.

Also tested at the same time as the C3-4 was a hard-surface disk system that has more memory and much more storage capacity, a hefty 74M bytes. The use of the hard disk roughly doubles the speed of I/O operations and brought the accounts receivable time down to 4:16.9.

Tape cartridge and 9-track tape storage are also available for the Ohio Scientific systems; these are used mostly to backup the hard-disk data.

Languages available for the systems include Basic, Fortran, Cobol and Pascal. Three operating systems are offered: the OS-65U tested in the benchmark series, OS-65D and CP/M.

In the user interviews conducted along with the benchmark test, Ohio Scientific's documentation for the C3-A was the most severely criticized aspect of the system. While it is rare to find a computer firm whose technical literature is universally praised, several users panned the Ohio Scientific efforts as incomplete and difficult to use. Our independent consultants were even more severe in their criticism, calling it "an incomplete collection of ideas, suggestions and features randomly assembled and poorly reproduced."

The applications software offered for the system also came in for heavy criticism. Users complained that little was offered, that it needed modification before use, lacked quality control and came with no factory support. Together with the documentation problem, the software was of questionable value.

More positive comments were received about the hardware. Reliability and low cost were frequently named, and expansion capability into the multiuser and hard-disk storage areas was cited as a key feature.

Based on the overall reactions, our conclusion would be that the C-3A is best used in connection with a close working relationship to a dealer or OEM who can provide a high level of software support to complement the Ohio Scientific hardware.

## SCOREBOX

**System: Ohio Scientific C3-A**
**Current Price: $10,440**

| Series 1 Results*** Systems up to $15,000 | C-1 (Scientific/-Engineering Time | C-3 Accounts Receivable Time |
|---|---|---|
| Pertec PCC 2000 | 28:48.4 | 6:04.3 |
| North Star Horizon | 12:01.9 | 1:57.7 |
| Cromemco System Two | 14:52.6 | 2:48.0 |
| Texas Instruments 771 | 22:05.4 | 3:38.1 |
| Vector Graphic System B | 19:30.0 | 5:56.5 |
| Decstation 78 | 7:55.7 | 4:21.5 |
| Radio Shack TRS-80 Model II | 20:00.7 | 3:38.6 |
| Apple II | 21:11.0 | 6:17.4 |
| Digital Microsystems DSC-2 | 13:24.9 | 3:28.8 |
| Ohio Scientific C3-A | 12:10.7 | 15:49.3 |

| Series 2 Results*** Systems $15,000 to $25,000 | C-1 | C-3 |
|---|---|---|
| IBM 5110 | 29:47.2 | 4:11.0 |
| Wang 2200VP | 2:05.8 | 3:20.0 |
| Texas Instruments FS990/10 | * | 3:18.6 |
| Hewlett-Packard System 45 | 4:38.9 | 5:05.8 |
| DEC PDP-11V03 | 14:43.4 | 4:14.0 |
| Q1 Lite | 6:50.7**** | 5:03.3**** |
| Univac BC/7-610 | 12:09.2**** | 10:37.0**** |
| Northern Telecom 405 | * | ** |
| Datapoint 1170 | 38:27.5 | 6:50.4 |
| Randal 100 | 13:52.4 | 10:05.0 |
| Hewlett-Packard 250 | 4:05.9 | 4:45.7 |
| Texas Instruments DS990/2 | * | 2:48.3 |

*Test could not be run because of memory limitations.
**Test could not be run because of formatting limitations.
***Both Series 1 and Series 2 were run on the same programs.
****Results include both compile and run-time.

**This is the twenty-fourth in a series of articles giving the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.**

## About the Author

*Hillel Segal is president of the Association of Computer Users (ACU), a nonprofit association with members all over the U.S., Canada and many other foreign countries.*

*One of the association's key activities is the publication of its "Benchmark Reports." Each month a new 24-page report is produced covering another computer system.*

*In addition, ACU publishes seven bimonthly newsletters for users of small computers, midi computers, large computers, time-sharing systems, distributed processing systems, word processing systems and home and hobbyist computers.*

*A complete package of information about the benefits of membership in the Association of Computer Users is available from them through P.O. Box 9003, Boulder, Colo. 80301.*

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# Guidelines Created for MRP Package Evaluation

WILLISTON, Vt. — A company that tries to evaluate a material requirements planning (MRP) package without the benefit of experience in the field will typically spend from $40,000 to more than $150,000 on an in-house evaluation, according to Darryl Landvater, president of Manufacturing Software Systems, Inc. (MSS).

The evaluation process can take more than a year of elapsed time, he claimed, and "most of those companies will still run into some surprises as they begin to implement the package they've selected."

Landvater teamed up with MRP specialist Oliver Wight to develop a set of guidelines described as the "Standard System" for the evaluation process. And, he recommended that any company considering an MRP package follow the same three steps that MSS goes through for a standard system package evaluation.

First, review the system documentation. Then, allow one or two days for an in-depth interview with the particular vendor. Third, put a draft version of the evaluation down on paper and make certain that any missing functions are discussed prior to contract negotiation.

Both Landvater and Wight stressed that regardless of whether a prospective MRP software purchaser opts to use outside specialists for the evaluation or chooses to do the work in-house, three fundamental design principles are common to effective systems.

• *The system must simulate reality.* Systems that really work in manufacturing areas should answer these four questions — What are we going to make? What does it take to make it? What do we have? What do we have to get?

• *People must be held accountable for making the system work.* An effective system supports people in day-to-day operations. It does not assume responsibility for management tasks or decision-making. "The computer said to do it" must be an unacceptable answer, Landvater said.

• *The system must be transparent to the people using it.* "The operating systems that really work are those where the logic is standard and obvious to the user," according to Wight.

Anyone who accepts accountability for results from a system should be able to answer, "Why did it do that this time?" Wight concluded.

# Latest Computer Game Simulates Hostage Negotiations With Iran

NORTHFIELD, Minn. — The latest in computer simulations here at Carleton College is the hostage game. A professor of international relations, Hartley Clark, has developed a program that simulates U.S. negotiations with Iran to free the 52 former hostages.

The object of the game is to release the hostages, avoid a war and preserve the U.S.' interests in the Persian Gulf. Successfully accomplishing those goals will net about 20 diplomacy students a maximum of 100 points in dealing with the crisis.

Run on a Digital Equipment Corp. VAX-11/780 with 1.5M bytes of main memory, the program begins with a briefing of what has happened in Iran since 1979 when the Shah of Iran was overthrown up to the U.S.' unsuccessful rescue attempt last year.

### Ransom Demands

The program then lists Iran's ransom demands, such as: dropping law suits against Iran, unfreezing Iranian assets, returning the late Shah's fortune to Iran and issuing a U.S. promise not to interfere in Iranian affairs.

The user is then given six options, he selects one and the program keeps giving options until either the hostages are freed or the hostages are tried as spies.

"The exercise required students to keep a number of different values on their minds at the same time. This model has 10 values, but some negotiations involve 100.

"The program shows how you can take two different sets of goals and values and combine interests to reach an agreement," Clark said.

# Efta Elects Moroney Second President

WASHINGTON, D.C. — The Electronic Funds Transfer Association (Efta), set up in 1977 to provide a public policy forum for electronic funds transfer issues, has elected William R. Moroney its second president.

Moroney joined Efta from The National Consumer Finance Association and the American Bankers Association.

Efta's 45 members are involved in different facets of EFT and include banks, software services and manufacturing companies.

Members receive a monthly newsletter and three issue papers on timely topics each year. The association holds about eight conferences annually. Membership fees are set according to a company's business. More information is available from the association at Suite 502, 1029 Vermont Ave., N.W., Washington, D.C. 20005.


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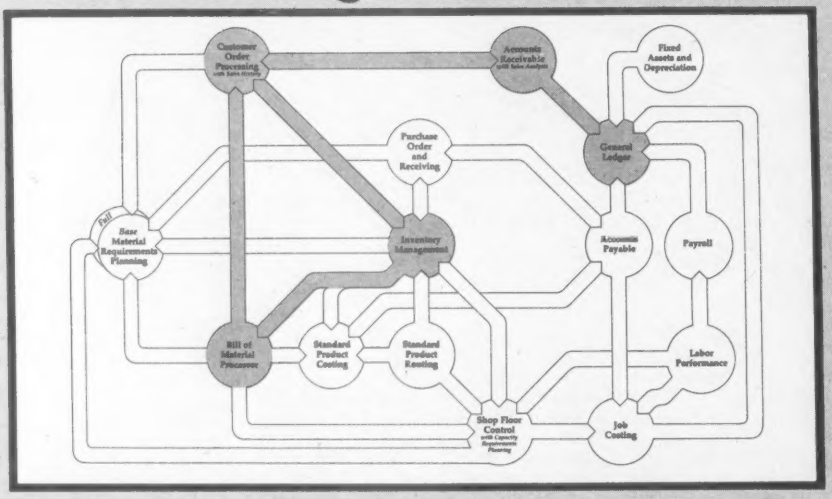


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CW 181

Boy Scouts transfer accounting information with TI's 765 data terminal.

# Boy Scouts of America Explore Portable Terminal Technology

HOUSTON — Although the Boy Scouts are a symbol of the good old-fashioned values in American society, the organization isn't adverse to adopting the latest technology to run its operation.

Until recently, the Boy Scouts of America organization has been transmitting financial data from its 90 member councils to the central host system using outmoded paper tape terminals.

To solve the problem of funneling information from remote locations to the host computer, Boy Scouts of America decided to update its terminal system with Texas Instruments, Inc.'s Model 765 portable terminals featuring bubble memory.

Weighing only 17 lb, the 765 data terminal can be easily transported by council members. To communicate with the central processor, the council member simply plugs the 765 data terminal into an electrical outlet, places a standard telephone receiver into the data terminal's built-in acoustic coupler and transmits the data to the host computer in Irving, Texas.

The local councils transmit financial information to the host computer and then receive a monthly financial report showing up-to-date debits and credits as well as cost breakdowns for uniforms, badges and books. Councils can also request a monthly fund-raising report that itemizes donations pledges on a district-by-district basis.

### Digital Data Storage

With the 765's bubble memory, stored information is never lost. Contained in a small module bubble memory is an electromagnetic circuit that stores digital information by changing the magnetic polarity of a thin crystalline film. The bubbles are actually cylindrical magnetic islands polarized in a direction opposition from that of the film in which they function.

Bubble memory has no moving parts, and because it works magnetically, it can retain information even after the power is turned off.

"We use the 765's bubble memory for remote batch transmission," Bill Andrews, director of the Boy Scouts' management systems, said. "We didn't want the council staying on-line with the main computer for a long time keying in data and editing it. With the 765, data can be entered, stored, edited and transmitted at time convenient to the council." Council members can accumulate the equivalent of up to 20 pages of typewritten financial information before they need to transmit to the host computer.

The portable terminal has an easy-to-use keyboard and a self-test diagnostic capability so that trouble areas can be pinpointed quickly and downtime can be minimized. For additional ease of operation, the scouts are experimenting with the terminal's Data Entry Validation Option (Devo), which provides user-programmed data verification and prompts an operator through data entry procedures.

With the use of TI's thermal printhead, the terminal printing speed of 30 char./sec is virtually silent. "The clerical staff likes the quiet printing because it doesn't disturb the work environment," Andrews said.


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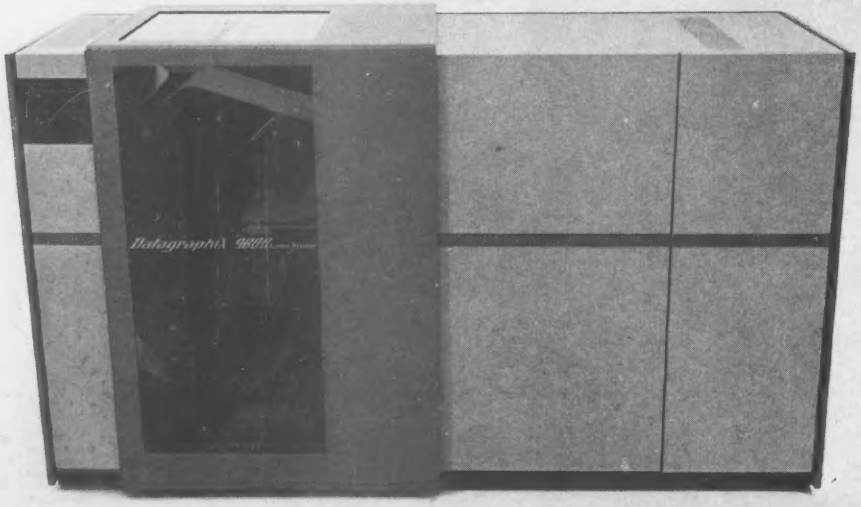

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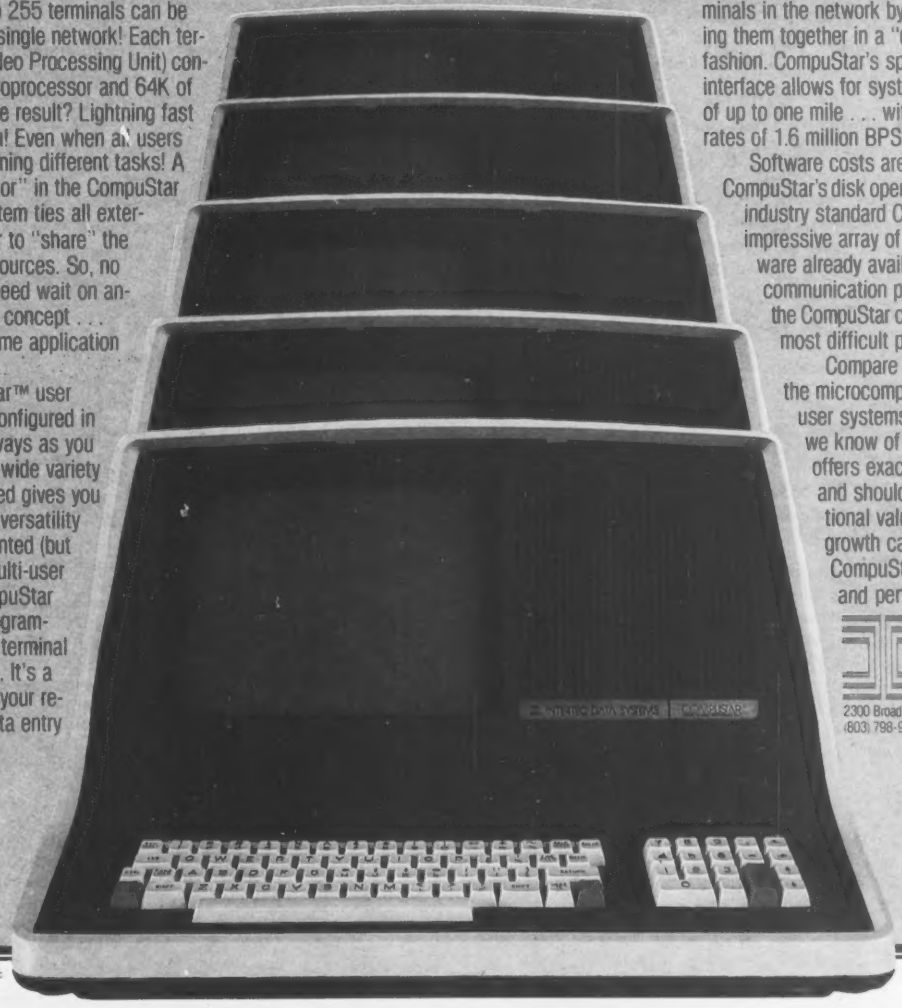

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# UPS Lightens Power Plant's Switch to On-Line

CLEVELAND — Even if the lights go out here, your electronics order will come through on schedule now that Pioneer-Standard Electronics Corp. has installed an emergency power plant with an uninterruptible power source (UPS) at its heart.

The isolation from power problems furnished by the new UPS has been particularly important to Pioneer because the company currently is converting from batch to on-line processing, a more vulnerable operating mode.

A distributor of electronics products to customers in 19 eastern and central states, Pioneer had sales exceeding $100 million in 1980. For the past five years, the company has been expanding its data processing operation.

"Ultimately, we would like our entire operation to be completely on-line," Preston B. Heller, president of Pioneer's Instrumentation Division, explained. It is Heller's division which serves as the testing ground for new and upgraded software.

*'With power forecasts predicting more of the same, Pioneer believes that its emergency UPS system is an investment for the '80s and beyond.'*

Pioneer has been using a Sperry Univac 90/30 with a 500,000-char. core memory for four years and recently has augmented it with a Univac 90/40, which provides additional speed and another 750,000 char. of memory. On-line mass storage is provided by seven disk drives with a capacity of 1.4 billion char. and two U16 tape drives as backup. Thirty-two remote terminals, six character printers and three line printers complete the peripheral equipment.

All order entry, invoicing and accounts receivable for stock items in the Instrumentation Division are performed on-line. "The strategy we are pursuing at Pioneer is to provide the necessary protection and backup to minimize DP downtime and to keep things running evenly if trouble does occur," Heller said.

A special concern during the switch from batch to on-line processing has been the effects of potentially unstable power on Pioneer's computer. Heller explained that power reserves are expected to dip dangerously low, at least through 1987, because of construction holdups at two nuclear power plant sites in Ohio.

### Weak Points

Much more frequent and also damaging to a computer's operation, according to Heller, are high-speed voltage transients and electrical "noise." "Our disk drives are also vulnerable to this type of power problem. With a drive operating at 3,600 rpm, it doesn't take much of a power glitch to produce a faulty read or write," he said.

To furnish backup emergency power during a blackout and isolate equipment from line transient activity, Pioneer recently installed a 50 kVA UPS manufactured by Sola Electric, a unit of General Signal, and a 150 kVA engine generator. Pioneer chose Sola because it has long been a distributor of this vendor's products, Heller explained.

In the three months since its installation, the UPS has carried the firm through power outages totaling nearly 20 minutes, saving additional time which would have been spent recovering lost data and repairing damaged system components, Heller said. "With power forecasts predicting more of the same, Pioneer believes that its emergency UPS system is an investment for the '80s and beyond," he added. The UPS also does double-duty as a "showroom demonstrator" in a model emergency power installation, since the unit is part of Pioneer's product line.

The UPS and engine generator are housed in a separate building cooled and ventilated by a three-ton air conditioning unit triggered to maintain operation if commercial power fails by drawing on the engine generator. The UPS battery bank, which provides five minutes of emergency power at full load, also is located here.

The diesel engine generator is a 3,000 cubic in., six-cylinder unit designed to start automatically in a power failure. Drawing fuel from a 500-gallon reservoir, it will supply up to 36-hours of power to the lights and air conditioning in the computer room.

All power to the computer system itself is circuited through the UPS, which eliminates a possible 6 to 10 sec delay required to bring the generator on-line and therefore supplies no-break backup power.

The UPS system uses a multiple-step, pulse-width-controlled inverter with impulse current commutation of the inverter's SCR's. This provides a regulated three-phase 120/208 Vac output at high operating efficiencies approaching 85%, according to Heller.

As a built-in safeguard against malfunction within the UPS or overload caused by start-up surges, the UPS includes an ac bypass line connected through a solid-state transfer switch. This senses any sharp change in UPS output and responds by immediately switching in the ac bypass line so the load can draw power directly from commercial ac service.


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# Books Enrich Management, Software Design

By J. Daniel Couger
Special to CW

Management of data processing and software design are the two categories most enriched by new books in the 14th edition of the *Annual Bibliography of Computer-Oriented Books*. Over 270 new books are included in the bibliography released this month by the University of Colorado.

Seventeen new books were published on the subject of DP management. Improvement in quality of books in this area is illustrated by Jim Johnson's *Managing for Productivity in DP* and *Software Maintenance Management* by Lientz and Swanson.

In the software design, Cho's *Introduction to Software Quality Control* and Conley's *Computer Optimization Techniques* are representatives of the quality improvement.

All introductory-type books published prior to 1978 were deleted. Despite the deletions, the bibliography still contains more than 1,000 titles from over 150 publishers. The bibliography separates the books into 55 categories and catalogs them according to type (reference, textbook, handbook) and style of presentation (programmed instruction, case study of narrative).

### Management of DP

The size of this section (74 books) necessitates subdivision. There are now 12 titles in the project management section and nine in the personnel performance section. A new book in the latter category is *Software Psychology* by Shneiderman. Another is *Teams in Information Systems Development* by Semprevivo.

A newcomer in the system security section is *Computer Security, Management Audit Approach* by Enger and Howerton. The general section includes Cortadas' new book on *EDP Costs and Charges*.

### Programming Books

Of the 64 new books on computer programming, 17 fall into the category of advanced programming. Peter Henderson's book on *Functional Programming* is an excellent addition to that category.

In the structured programming area, Ingevaldsson provides clarity and conciseness to the Jackson methodology in his book entitled *JSP. A Primer on Structured Programming Design* by Richardson and others is a welcome addition in this category, which now contains 25 books.

Pascal is supplanting Fortran. Two years ago 12 Fortran books were published. Last year only seven were published. Only three Pascal books were published in 1978; 11 were published in 1980. Basic is in second place with 10 new books. The section on special languages now contains 18 books. Examples of additions are Wegner's *Programming with ADA* and the Fernandez/Ashley book on *CP/M*.

The special machine section expanded 36%, primarily by personal computing books, such as Albrecht's *TRS-80: A Self Teaching Guide*, and micros, such as Zak's *Programming the Z80*.

### System Analysis/Design

Six new books on data base enlarge that section to 38 books. Noteworthy is the book by Atre, *Data Base: Structured Techniques for Design, Performance and Management*. Chorafas' two books on distributed systems improve the quality of that category, which now contains 14 entries. The structured design section, totaling 14 books, is enhanced by Orr's *Structured System Design Methodology* and *The Practical Guide to Structured Methodology* by Page-Jones.

The management information systems category has four additions; one especially good book is Alter's *Decision Support System*.

The increase in applications books is disappointing. Although that section now contains over 200 titles, only 10 books were published in 13 of the 14 categories. The one exception is the word processing category, which increased by 10 books over the past two years.

The computers and society category consistently receives interesting additions, such as Mathew's *Monster or Messiah* and *The Computerization of Society* by Nora and Minc. The history/future section has three additions, the best of which is *The Micro Millennium* by Evans.

**Couger on Education**

The largest surge in new books is in the categories of micros and personal computing. Twenty-one books were added to these two sections. Some are excellent.

Examples in the micro section are *Software Engineering for Micros* (Lewis), *Microcomputer Interfacing* (Artwick) and *Distributed Micro/Mini Systems* (Weitzman). Examples in the personal computing section are Sawasch's *1,001 Things to Do With Your Personal Computer* and Zak's *Your First Computer*.

Copies of the bibliography are available for $4 from Computing Newsletter, Box 7345, Colorado Springs, Colo. 80933. The cost is $6 if an invoice is required.

*Couger is professor of computer and management science at the University of Colorado.*


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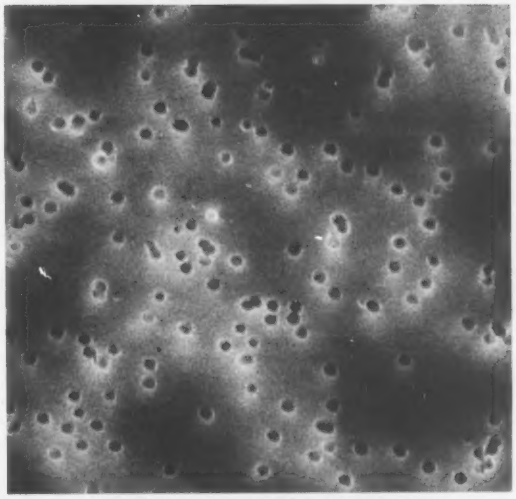

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## *Feeds on Solid-State Circuitry*

# EMP Invasion Latest Computer-Room Threat

*"In the event of a nuclear war there will be no chances, there will be no survivors — all will be obliterated."*
— Lord Mountbatten

**By Bruce Hoard**
CW Staff

WASHINGTON, D.C. — Fed up with high-priced programmers, decreased productivity and the national malaise in general? Now you've got EMP to add to your woes.

Electromagnetic pulse (EMP) is the electronic answer to the Doomsday Machine. Here's how it works: A hostile nuclear power detonates a one-megaton nuclear device at an altitude of 400 kilometers above Topeka, Kan. The subsequent explosion sends off a tidal wave of short-duration, high-intensity radiation pulses that scour the 48 contiguous states and most of Mexico and Canada.

As the heinous waves rain down upon America, they hungrily seek out communications broadcast stations, power utilities, computers plugged into standard power sources and any solid-state circuit unfortunate enough to be in their path.

Quicker than you can say Dr. Strangelove, the invading EMPs race through the unprotected electronic circuits, burning them out like roasted marshmallows. Zzzzzzt.

In the wake of this limited nuclear thrust, the once-mighty motherland rolls over on her bloated side and succumbs meekly to an all-out invasion by Communists of every stripe.

That admittedly worst-case analysis isn't very likely to transpire — or is it? Wilson Clark recently wrote a report for the Federal Emergency Management Agency (Fema) entitled *Energy Vulnerability and War*. Although he is not predicting any confrontations, he is quick to cite our national lack of preparedness in the case of one.

"Solid-state circuitry is one of the most vulnerable elements of modern technological systems when it comes to EMP," he said. "And there is no real civil defence program in the U.S. The Soviets spend 20 times as much as we do on civil defense."

The USSR has also included EMP in its military defense, according to Clark. Although American technological and military pundits scorned the "low" technology of a Russian MIG Foxbat fighter that was flown to Japan by a defector in 1976, Clark defended its use of vacuum-tube circuitry.

"The U.S. press called the Russian plane unsophisticated, but it was designed to operate in an EMP atmosphere," he claimed, adding, "many of our B-52s still use vacuum tubes."

There has been at least one EMP incident in the past, the author pointed out. It came after the U.S. conducted one of its final atmospheric nuclear test explosions over Johnson Island in the Pacific Ocean during 1958.

EMP waves from that blast traveled some 800 miles to Hawaii, where they set off burglar alarms and disrupted traffic lights, he claimed. Twenty-two years later, the effects of such a bomb could be far more drastic across the North American continent, he added.

"We've become a substantially different society in terms of our reliance on solid-state technology and other systems that would have a great susceptibility to the EMP effect since then," he declared.

### No Strong Defense

How to defend against so ominous a threat? The prospects are not very rosy, according to Jim Kerr, director of Technology Hazards Research at Fema.

Basically, lightning protection is a good move," he commented. However, "there's no specific thing you can do to make yourself EMP-proof," the director added.

There is hope, though. In the event we are notified before an EMP attack, computer users and other solid-state owners can merely unplug their sensitive equipment. If, on the other hand, our attackers are not courteous enough to forewarn us — well, Zzzzzzt.

Another, more secure way to protect computers is to enclose them in what Kerr called a "Faraday Cage." This electronic fallout shelter would choke off the demonic EMP waves in their radioactive tracks before they wreak their havoc, he said.

But the last line of defense may be our newly inaugurated president, according to Bill Williams, news and information director at Fema. EMP is an aspect of civil defense and President Reagan has made many comments about civil defense, he stated.

President Reagan has made it known he stands for a stronger America. He wants to re-arm and serve notice that the U.S. is not going to be shoved around any more. But if we get too strong, and shove back too much — Zzzzzzt.


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## Correction

The last line in "Government Contracting for ADP Seminar" [CW, Feb. 9] was accidentally left out. The Computer Law Association can be reached at 6106 Lorcom Court, Springfield, Va. 22152.

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# Model May Help People With Crippled Hands

BATON ROUGE, La. — A professor of mechanical engineering at Louisiana State University here hopes to help surgeons improve the ways they correct deformities in human hands caused by accidents or such diseases as arthritis.

Prof. David Thompson is using the school's computer to create a complete mathematical model of the human hand. For a physician, he said, such a model could mean a greater probability of success for selected surgical procedures. For a patient, it could result in the use of a hand again — the ability to pick up a coffee cup, button a shirt, put a key in a lock or drive a car.

Ultimately a surgeon would be able to gather information about a patient's hand, enter it into a computer and see an image of how the hand would look two, three or five years away unless he intervenes. "Then he'll be able to simulate corrective procedures, using a graphics terminal, adjusting them as necessary and seeing how the hand responds," Thompson explained. "This could make a tremendous difference in the future function of the hand. The doctor could even decide that physical therapy is a better approach than surgery."

Although there are numerous intricate anatomical drawings and descriptions of the human hand, no complete biomechanical description of the hand now exists, Thompson said. He is collaborating with Dr. Paul W. Brand, an orthopedic surgeon, and a team of engineers, physicians, physical therapists and others. They were assisted by professors, visiting surgeons and electrical and mechanical engineers.

Early efforts of the team involved measurements taken in the Biomechanics Laboratory at the Public Health Service Hospital in Carville, La., on the arms of cadavers. Members studied the interplay between the various elements of the musculo-skeletal system.

About three years ago, Thompson began to mathematically model the hand using these measurements as a guide. The model is a series of mathematical equations describing how various bones, ligaments, tendons and muscles interact. These equations were matched to the data using the university's IBM 3033 processor.

Team members then used the computer to predict how changes in the course of tendons, variations in muscle strengths and dislocations of the axes of the joints would change the power and flexibility of the hand.

Current research is funded in part by the United States Public Health Service, the Arthritis Foundation, and Louisiana State University.

## Seminar to Cover DOS to OS/VS

DALLAS — University Computing Co. (UCC), a subsidiary of Wyly Corp., is hosting a series of five free one-day seminars on DOS-to-OS/VS conversion planning.

The workshop-style format is aimed at giving DP decision-makers the chance to discuss their individual problems with UCC's seminar staff.

The seminars will be held in five locations: San Francisco, March 25; Kansas City, Ks., April 9; Minneapolis/St. Paul, April 23; New York, May 7; and Washington, D.C., May 20.

More information is available from Maxi Greer, software marketing associate, University Computing Co., UCC Tower, Exchange Park, Dallas, Texas 75235.

## Edpaa Forms Phoenix Chapter

PHOENIX — A local chapter of the Electronic Data Processing Auditors Association (Edpaa), called the Phoenix Metro Chapter, has been organized to serve communities in the Phoenix area.

This will be the 48th local chapter of the nationwide organization, headquartered in Carol Stream, Ill.

The first meeting was held Jan. 15 when Gary T. Grimm, of Western Savings Bank, was installed as the chapter's president.

"We plan to set up seminars in the Phoenix area to exchange ideas on DP auditing," Grimm said.

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## *Teaches Teacher How to Teach*

# System Pins Physics Students' Problem Areas

By Lois Paul
CW Staff

HOUSTON — Computers at the University of Houston are teaching a physics professor how his students learn physics.

After teaching introductory physics to large groups of freshman since 1972, H. Thomas Hudson had gathered bits of information about students who were successful at learning physics and those who were not.

His problem was determining what to do with this information. "I've got 100 kids looking at me and I've got an hour or so to teach them."

With his introduction in 1976 of computer-graded and analyzed diagnostic tests, videotapes of classroom lectures and interactive computer terminals to help confused students, Hudson now can use the information he has gathered to benefit both himself and his students.

He begins each semester by administering a diagnostic test of math skills needed for physics. The answers are optically scanned and the results are analyzed by the university's Honeywell, Inc. 66/60 system, which has 1M byte of memory.

The test results enable Hudson to measure the level of understanding and to see where the students' thinking breaks down, he said.

The computer can tell each student, "You understand these problems. You are uncertain on these others. You do not understand these problems. You took too much time on these," Hudson explained, noting that the diagnostic test has been the most productive tool.

From these results, Hudson can determine what 90% of the class cannot handle. The computer then prepares individual plans for the students which they use in a physics learning center equipped with Commodore Business Machines, Inc. PET 4016 and 4032 microcomputers.

This computer-aided instruction enables each student to review the areas that have given him problems until he understands them. All the programs used on the microcomputers have been prepared by Hudson and advanced physics students.

### Stretching Resources

"The whole purpose of this is using computers for stretching human resources. Tutors are the best of all worlds, if well trained," he said, but enough tutors are not around. "There are 500 students with problems and 10 tutors. Students will stand around waiting for the tutors, and they'll become disgusted," he said.

According to Hudson, the majority of students can be helped sufficiently by the computers. The 10% with unique problems are directed to the tutors.

One phenomenon the computer system has helped Hudson discover is visual spatial orientation problems. If geometric patterns are familiar to the students, they do well with test problems. If, however, triangles in a test are rotated, the students will have problems with the exact same examples, he said.

A major benefit of the program, according to Hudson, has been the ability to use information like this to help students learn. "I can, for example, on the basis of six questions, tell a student with an 80% certainty that he is not going to make it through the course."

Now that the computer's analysis and remediation programs are available, Hudson said he can tell the student what steps must be taken to solve the problems.


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# EDITORIAL

## Energy and the User

Electric utility companies constrain the ability of DP users to process data reliably and cost-effectively. Certainly they are not the only important constraint, but mounting evidence does show that computer circuitry can be damaged and job executions disrupted by the delivery of poor-quality electric current.

Moreover, the sheer cost of electric power to particular computer devices may exceed the initial purchase costs of the equipment. The utility companies themselves agree that power rates, reckoned in dollars per kilowatt-hour, will soar in coming years. Expert observers estimate the increases, driven by the rising price of petroleum — which many utility companies use to generate current — and the general effects of double-digit inflation, will be more rapid than ever before.

To their credit, some computer vendors see energy efficiency as a strong selling point for their wares and a number of systems and peripheral devices introduced in recent years have claimed energy consumption levels far below those advertised for competitive products.

Nevertheless, the recently released Frost & Sullivan, Inc. report, "Energy Efficient Data Communications Networks," indicates that most data communications users do not consider the energy factor in decisions to buy hardware. According to a user survey summarized in the report, 80.7% of respondents neglected to consider energy consumption in procurements; 90% of these users said they neglected energy because it did not seem likely they could save much money that way.

Like the nation's car users, DP users may soon scramble to make energy efficiency a key factor in procurement decision-making. But can electric utility companies be held more accountable to users for quality of service?

Studies such as Frost & Sullivan's indicate that data communications users are as sensitive to the effects of rising electric power rates as they are to the effects of rising carrier rates. For decades, the Federal Communications Commission has regulated the carrier rates set by AT&T and other providers of switched voice networks, but the electric utilities have dealt with nothing comparable, in practice, to that body established by an act of Congress in 1934.

Regulatory bodies do confront the electric power industry, at the state and federal levels, but that industry has still given the world the crisis at Three Mile Island and no reason to believe it is willing or even able to significantly overhaul power generation resources. Many utility companies have made themselves dependent on nuclear energy for the remainder of this century despite signs that, for various reasons, that source of power will not be tolerated by the public.

DP users are a tiny minority of any power company's full customer base. Yet DP is a critical national resource. Power companies must be held accountable for delivering good service to that resource — by users of DP where government appears ineffective as a regulator.

# DATA PAST

### Five Years Ago
### Feb. 23, 1976

NEW YORK — Much of the testimony given by witnesses in the U.S. government's antitrust suit against IBM — perhaps as much as 50% to 75% — had been unnecessary, according to IBM's lead counsel. Lawyers for IBM and with the Department of Justice easily could have stipulated (agreed to the truth of) a great deal of the materials entered into evidence by the government in its case so far, Thomas D. Barr told Judge David N. Edelstein.

### Ten Years Ago
### Feb. 24, 1971

NEW YORK — Honeywell, Inc. strengthened its large-scale computer line by adding a six-model 6000 series with new business processing capabilities. The series was an outgrowth of the General Electric Co. 600 line.

———

BALTIMORE — A computerized recomputation of more than two million Social Security recipients' earnings yielded an increase of from $5 to $25 in monthly benefit checks in 1970.

# LETTERS

## Hardly Traumatic

Must Cobol forever remain thrashing about in the swamp, all in the interest of down-level compatibility, or will it be allowed to evolve toward a more structured form, better able to achieve its mission of making *large* programs comprehensible?

Granted, the X3J4 committee's proposed mini-leap will cause some short-run hassle, but in this regard three points should be made:

1) The changes will affect old programs only if and when they need to be modified and recompiled for other reasons. In this respect, the standards change will be much less disruptive than the postal Zip Code expansion, an event which not only refuses to let sleeping dogs lie, but threatens to wake up half the kennel.

2) The adjustment required when an old program needs recompilation is hardly traumatic. All that is needed is preprocessing by a standards-converter utility, which will:

a) slightly but systematically misspell any words which the Cobol-80 compiler would now regard as reserved,

b) substitute switches to perform the function of ALTER statements,

c) change to asterisk format those comments which are not already in this form, and so forth.

Such a utility should not be difficult to write. Indeed, it may be available in your local supermarket by the time Cobol-80 hits the streets.

3) Those shops that *really* want to cling to the old standards can cling to their old compilers as well. They won't rust.

Craig H. Morgan

Carlisle, Pa.

## Can't Hold Back Forever

Recent issues of *Computerworld* have had front-page stories about large companies not wanting to experience large conversion efforts as a result of the new Cobol standard. This is a very short-sighted point of view on their part.

As a professional maintenance programmer, I have had to maintain many nonstructured programs, and even programs written in a structured way with Cobol-74 leave something to be desired.

The above-mentioned short-sighted companies with their thousands of existing programs will not be able to hold the rest of us back forever. Let Cobol-80 become a standard, and let them continue to compile their Ansi-74 programs on an existing Ansi-74 compiler, or an Ansi-68 compiler or a 1401 Autocoder translator or whatever they now use, and let the rest of the world progress in peace.

Steve Vance

San Francisco, Calif.

## Problem Solved With PL/I

It is with some amusement that I observe the furor involving the addition of new reserved words to the Cobol-80 standard. This is not a new problem, but only an indication of a much larger problem caused by the plethora of rarely used reserved words. How many novice (and not-so-novice) programmers have fallen into the trap of using "LINE-COUNTER" as a data-name or labeling a paragraph "FINAL"?

The designers of PL/I years ago solved the problem of allowing language extensibility while avoiding the obsoleting of current programs by designing a language which has no reserved words. A PL/I programmer can use whatever identifiers seem most natural without concern over conflict with some obscure section of the standard or some possible future "enhancement."

Peter R. Flass

Saratoga Springs, N.Y.

## APL's Difficulties

In response to Bob Armstrong's letter regarding APL [CW, Feb. 2], I agree that APL is a very powerful, rich language. However, there are considerations to be made. APL and its file I/O are more isolated from the mainstream of languages and file management. This makes it difficult to share data between an APL system and a traditional language system.

The cryptic nature of APL characters make it difficult for some people to understand another person's APL program. In some cases, people rewrite good APL programs when they take over responsibility of the programs because they don't understand what the APL statements were doing.

The majority of people who use APL at Xerox, where I work, are end users. The systems and programming groups develop production systems primarily in Cobol/IMS, although some smaller systems have been written in APL. Of all the work done on our mainframe computers, APL accounts for about 12% of the CPU time.

As pointed out at the recent APL Users Conference in Toronto, efficient use of APL requires more than casual training. The end user should not have to become a trained programmer to solve a financial modeling or forecasting problem.

I believe that the growth of APL will taper off as more application tools become available. Tools which are designed with the end user in mind (financial analysis, operations research and so forth) are more productive for the end user than writing and testing programs.

APL will remain an excellent language for certain types of work, such as prototyping, short life-cycle tasks, tasks independent of mainstream processing and work oriented toward numeric matrix manipulation. Those people who make claims for APL being the ideal language for all applications usually have a vested interest in the growth of APL.

Russ Lipp

Henrietta, N.Y.

## Fit Retribution?

Regarding the Cobol-80 controversy, we in DP are often accused of having the arrogance to assume that we know what's best for users.

Perhaps it's retribution that now the Ansi X3J4 subcommittee has the arrogance to assume that they know what's best for us.

Rick Martin

Bethel, Con.

READER COMMENTARY/Adolf F. Monosson

# A Eulogy for Old Friends

Nine years in a friendship is a long time, especially in the business world. Nine years of walking by that printer left over from a PDP-10. Nine years of looking at the shiny chrome around the head.

Nine years of keeping it dust-free. Nine years of the memory of the system from which it came. Yes, its time had come. Our friendship was to be dissolved.

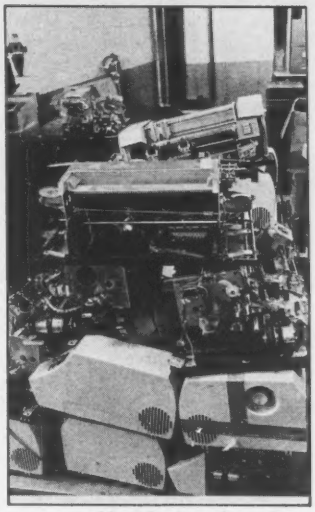
It was not easy, but reality must be faced. That large monstrous printer was obsolete, and my emotional attachment to it did not make it any more marketable. It worked, but it had no buyers. It had to be scrapped.

I suppose once this difficult conclusion had been reached and accepted, although not easily, the other 764 items became a simpler job.

### Flashback Experience

Walking amidst 765 items was like a flashback of my 10 years in the used computer business. It brought memories of the sellers, memories of the buyers, memories of the technicians who helped, memories of the problems with vendors, memories of the solutions, memories of our growth. Yes, our history was in front of me . . . on the way to Taiwan.

The men from Taiwan were here. Parked in front of our five-ton freight elevator was a shipboard container to be filled with our computers and peripherals. We were not selling them as listed in our catalogs and fliers. We were selling them as scrap as people sell scrap cars, scrap machine tools. Their end was at hand.



Now they're only trash . . .

CW Photo by A. Dooley

. . . tied up to go.

The largest single group of items was the Teletype ASR 33s. We had forgotten how many of these we had accumulated. We never bought an ASR 33 as such. They were the standard of the industry 19 years ago, nine years ago, eight years ago. Every time we bought a minicomputer system or a computer system, whether it was a Digital Equipment Corp., IBM, Sperry Univac or Varian, it came with an ASR 33, the standard of the industry for I/O hard-copy devices. What happened to the ASR 33s? They still worked, but no one wanted them. What happened to them is the classic story of what happens to many similar successful devices.

DEC, one of the largest consumers of Teletype ASR 33s, decided to make its own. In so doing, it produced a machine called the Decwriter, which became the industry standard that outflanked the ASR 33 before Teletype could awaken. And lo and behold, our ASR 33s, KSR 33s, ASR 35s, KSR 35s, ASR 37s and KSR 37s became unwanted! So they were slated for Taiwan.

Joining these ugly-looking but efficient print mechanisms were the Cadillac of that era, the General Electric Terminets. They were modern looking. They were efficient. They were high priced, but they also suffered the end run of DEC, and they too were headed for Taiwan.

### Never Used

As I rounded the next aisle in front of me there were 13 Memorex Corp. Model 40 CPUs — the equivalent of an IBM 370/148. These had never been used. They were purchased from Memorex when Memorex abandoned its plug-compatible CPU business. These units were being scapped too.

The experience is traumatic! These units originally sold for more than $100,000 for the CPU and now would yield us no more than scrap. Not

(Continued on Page 42)

HUMAN CONNECTION/Jack Stone

# Job Descriptions Must Stress Workers' Results

Bill Delaney, president of Analysis and Computer Systems, Inc. of Bedford, Mass., shared some of his experiences with job descriptions in a letter regarding my recent column on the subject [CW, Jan. 26]:

"The massive and time-consuming effort that most large bureaucracies spend on documenting job descriptions is, in my opinion, an exercise in futility. Of course, managers should document general areas of responsibility for each job, but attempts to define the job 'to the nth degree' are bound to either fail or, as you reported, slow up or stop the entire evaluation and promotion process. Naturally, the lower echelon personnel are the losers."

Delaney has strong feelings on the length of the job description:

"There is an unfortunate human tendency we all have, which is that the less we know about a subject, the more we write or talk about it. Ask any teacher who grades narrative papers, or more to the point, any manager who reads progress reports. Here, we limit the length of progress reports to one page because employees were writing short stories to describe one week's progress (or lack of same).

"No job description should be more than two pages. When longer, it is too detailed and the manager tends to use it as a checklist to evaluate an employee. What happens is that the employee gets promoted if enough checks appear; but the evaluation of overall performance and attitude, which is really all that matters, gets lost in the detail. Furthermore, the employee quickly learns that the application of extra effort or the taking on of necessary tasks not in his job description doesn't result in 'brownie points.' Hence you hear him say, in explanation for why he did not put out the fire in the wastebasket, 'It was not in my job description — I am not a firefighter.'

"Lengthy job descriptions tend to make employees 'effort-oriented' rather than 'results-oriented.' They force the measurement of performance on too specific a set of items, rather than the total performance by the whole person."

Delaney went on to discuss how he used the document for "preselection":

"During my tours as a manager in the government and two large commercial organizations, I used the job description in a way that was never intended. When I selected someone for promotion for good attitude and performance, I would get a copy of the job description for the new position; then I would prepare a performance appraisal using these duties as the basis. The Personnel Department would review the appraisal and send me a report saying that the employee should be elevated to the new slot.

(Continued on Page 46)

THE TAYLOR REPORT/Alan Taylor

# Big Changes in Store For User-DP Relationship

Perhaps the biggest change in DP is the clear move of our current users to arm themselves with computer capabilities for their own purposes — like keeping letters spelled properly. But as yet, neither end users nor DPers realize the extent of the changes in store for them.

A letter I received recently from a long-time reader surprised me — because I had written it myself some 10 years ago. In it, I apologized for misspellings, saying I regretted that IBM wasn't yet supplying an RPQ to catch them. But now, 10 years later, IBM does supply such an aid, the reader pointed out. It is called the IBM Displaywriter, and sells to offices.

This fulfillment of a 10-year-old, half-joking prophecy made me look further to see what kind of impact this and similar developments might have on DP departments.

When you compare "computer-based" users with the current computer-innocent ones we are used to dealing with, the situation will change dramatically from the DP department's point of view. Until now, DPers in their departments have been able to perform very well for users who did not have access to computers, or to programming, themselves.

The important thing now is to check-out the possibilities for users' developing capabilities. Then, perhaps like my correspondent, we can chuck the predictions into a desk drawer for a few years; or perhaps keep them around to help in planning.

For instance, in defining a specification, will the user challenge the DP department's specifications and produce competitive parts of the system? Will he use communications to produce graphical outputs that suit him better than the ones that DP provides? And perhaps most important, will he start rejecting the DP delivery dates and providing his own programming and then expect DP to maintain it?

### New Methods Can Be Addictive

First, doubting whether such changes will catch on is rather like wondering some years ago whether pocket calculators would replace slide rules. The fact is, the new systems in both cases have capabilities to which the older ones could not aspire. So even though at first they may seem a luxury, they can become a normal part of the environment very soon after their introduction.

Consider, for example, capabilities like those of the Displaywriter. The idea of highlighting possible errors for review is very attractive, even though the current package is quite expensive. The price will be coming down, how-

(Continued on Page 46)

# A Eulogy for Old Friends

(Continued from Page 41)

much, not even enough to pay for the transportation to bring them here. Why did they end up in the scrap heap? Why? Why? Why?

A simple answer! The vendor stopped producing them. The vendor stopped supporting them. The vendor abandoned them. Like all abandoned children or items, they deterioriate and become worthless. That's what happened with those Memorex CPUs. Seven years they had been with us and now they had to leave us.

As I was wandering back to the rear of our warehouse, I noticed large black boxes, each one about three feet square and about five feet tall. What were they? They were DEC ME10 16K memories for a DEC PDP-10. My mind immediately flashed back to that first DEC transaction on MB10 memories with much slower internal speed than these ME10 memories. We sold those old MB10s for $53,000 apiece and now the ME10s were worth scrap.

Next to the ME10s were DF32s, the 32K disk drives for the early PDP-8 series — the 8s, the 8Is, the 8Ls. It was hard to believe that we had sold more than 400 of these, and now we were scrapping them. A victim of technological obsolescence. No! No!

No, not a victim of technological obsolescence, a victim of the insatiable demand of users for more storage. Thirty-two thousand bits of storage is very little by today's standards and consequently these DF/DS32s sit in their frames with no buyers. The RP02 of DEC was also a victim of the same desire of users for larger memory — the RP02s gave way to RP03s, RP04s, 5s, 6s and then the RM series of memories.

If I sound morbid at this point, I am. It is very difficult to sever years and years of associations. I started to head back lethargically towards our elevator well. In the corner of our warehouse, I spotted a Dataproducts Corp. 4000 series off-line print station — the remaining one we had. We had originally bought 159 of these units, had sold them and this unit was left.

This was a fine off-line print station in its day, originally priced at $72,000, and we sold it for $9,500 — but now, with laser printers running at 23,000 lines per minute, who needs an off-line printer? No one, and consequently this unit wasted away in the corner and fell to the Taiwanese scrap dealers.

As I was almost to the elevator, I noticed four IBM 026 keypunches. This was the machine that was still dying. This unit has finally succumbed to the tube — the glass tube. I just look at my own operation three years ago — no glass tubes — but today, 20 glass tubes. It took 25 years to "kill" this unit and it still struggles to survive. We still use two IBM 026s ourselves! Technology moves on, products become scrap. Seven hundred sixty-four items in all — some friends for nine years, some for less than six months.

### Sales That Never Happened

It is not an easy thing! The sentimentality attached to it, the memories of negotiations attached with the purchase of each piece, the remembrance of sales that never happened — but more important than all these, these white elephants in our warehouse served a very important function for a used computer dealer. They served as a reminder of the ease with which we can get trapped in the used computer business by all types of happenings.

*Vendor in financial difficulty.* The Potter printers were being scrapped as a result of these problems.

*Vendor nonsupport and abandonment.* The Memorex 40s are a classic example along with the Olivetti 318s and the Burroughs 700s.

*Vendor disappearance.* Machines like the Ultimac have no point of reference. They are now worthless and headed for the scrap heap.

*Technological obsolescence* of an efficient product and one that has existed for years — the classic example was the Decwriter that displaced the Teletype ASR 33.

*Change in user habits.* As the user expanded his systems and demanded more from them, the small disks, small core memories, slow printers and slow card readers lost all of their marketability and became antiques.

*Technological change.* The laser printer made our off-line print stations obsolete. When you print that fast, who wants off-line print stations that only print at 1,100 lines per minute?

I hope that without the sight of these white elephants we will not fall into the same traps that become so easy in a trading operation dealing in used equipment of any type.

At the last minute, I had one MRX 40 pulled back and put at the entrance to our warehouse as a symbol — or reminder — that we are all fallible!

*Monosson is chairman of the board of American Used Computer Co. in Boston.*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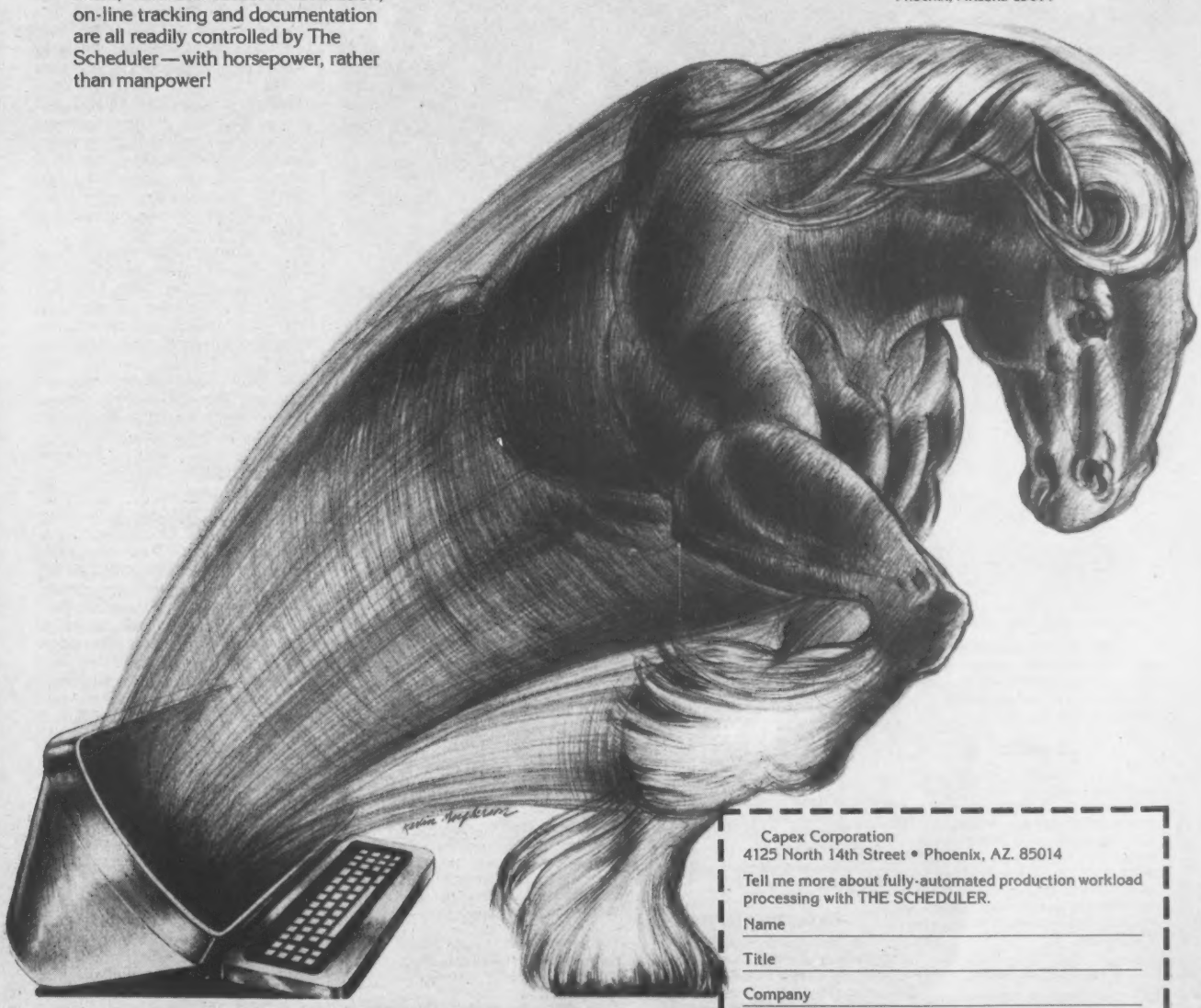

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# LETTERS

## Even More 'Overlooked'

I am glad to see *Computerworld* take a stand advocating that women as a group be noticed as a viable resource for promotion to upper management ["Still Too Scarce," CW, Feb. 2].

I would like to see CW be so fair as to advocate the same for other minority groups (such as blacks and Hispanics) who have historically and categorically been ignored or discriminated against within society in general, as well as within the data processing profession.

I would dare guess that should you do the same in-depth proportional analysis for blacks in the data processing profession as you have done for women, you would find them even more "overlooked" as a category for management promotions than women.

Howard Piggee Jr.
Arlington, Texas

## Passivity Not the Answer

If E.G. Johnston is, as he-she-it claimed, "one of the above" (woman, black or Martian), I would have to assume the Martians have indeed invaded the world of data processing [CW, Jan. 26]. To imply that sexual and racial discrimination will disappear of their own accord by not "calling attention to themselves" through special interest organizations, one would *have* to be a recently arrived Martian, totally ignorant of the civil rights inequities, battles, wins and losses of the past 200 years.

I too belong to a prestigious professional DP organization and have yet to find a seminar or convention presentation aimed at the problems of women or minorities.

I subscribe to five DP publications (including *Computerworld*) and am constantly offended by the articles and ads which portray women as clerks and operators, while (white) men are shown as the decision makers. (Foxy ladies reclining on copiers or hanging over disk drives don't count!)

A recently published salary survey listed the sending organization's management: 34 names, with one woman represented.

My favorite example is the unsolicited advertisement that greets you with a glossy three-color cover, "for the busy executive," and on the overleaf, "Dear Sir."

Come on, E.G. — these attitudes are not going to disappear by ignoring them and simple hoping they will die a quiet death all on their own. DP is presently a white male's dominion and will remain so until the discrimination is actively attacked and the problems revealed, recognized and resolved

Cynthia Casentini
Salinas, Calif.

## Thoughts on APL

I am moved by Bob Armstrong's request for comments to contribute my 2 cents about APL ["Don't Forget APL," CW, Feb.2].

I have been programming in APL full-time for more than two years and thinking in APL for about a year. I bit into Fortran, began to byte down harder on Algol 60 and knew that I had attained my majority when I learned PL/I. Then I ate an APL, and life has been Greek to me. I continually amaze myself with my increasing depth of understanding of APL operators and confess to dreaming about APL solutions to problems.

We dream in pictures, most of us. APL is a visual language. APL data structures, vectors and matrices may be likened to the lines and planes by which a painter transmits an image to a canvas.

With its emphasis on parallel processing, APL is a major departure from Fortran, Cobol and PL/I. It requires a different kind of thinking than serial compiler languages. In fact, I found myself feeling handicapped by being so well-trained in scalar-oriented languages.

I envy those children who will have the privilege of learning the "keyboard of foreign symbols" to which Bob Armstrong alluded, because they will learn APL thinking without having to unlearn older, more established patterns.

The APL thought process encourages disciplined thinking about problems, and such thinking results in efficient algorithms to manipulate data.

Ross Jay Bettinger
Culver City, Calif.

## Sensationalism

I believe "IBM's RMF Reporting Found 126% Off Mark" [CW, Jan. 19] to be a classic example of sensationalism in reporting. RMF does not provide any CPU usage figures based on regions/performance groups or what have you. The authors of the 17-month study at Occidental Petroleum, Walter Jackson and Bill Mullains, have clearly misunderstood RMF reporting. RMF reports CPU utilization in two categories:

1) Total wait time — the complement (100% - % wait) of which is the total CPU utilization. This is accurate, as the authors themselves agree.

2) It reports the total service units, and its breakdown by CPU service units, I/O service units and main storage occupancy service units, for each category of work (by performance group, domain and so on). By its very definition, the CPU service unit is the *captured SMF* CPU time multiplied by a machine-dependent constant (261.3 for an IBM 3033) multiplied by the CPU constants specified in the installation's IPS. It is from this CPU service unit that the authors derived their "regional" CPU utilization (probably through their own programming).

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# LETTERS

As you can see, this portion of RMF's reporting has the same flaws as SMF reporting, of which all of us in the performance measurement and capacity planning area have been very keenly aware for a long time.

Jackson's contention that using "SMF capture ratios raises the accuracy of regional reports to a more acceptable level" is therefore the only logical and well-known conclusion regarding usage of RMF work load reports for deriving CPU utilization by subworkloads like IMS, TSO batch and so on.

One word of caution for Jackson: Develop your own capture ratios using regression analysis rather than depending on IBM's or anyone else's.

Lindsay's analysis regarding RMF's channel utilization reports appear to be very logical and believable — even though I have not conducted personal studies in this particular area. Congratulations to Lindsay for his original work. If he has details of his study and is willing to share them, I would like to get a copy. I think it is this part of the article that should have been given the highlight.

Ved Sud

Washington, D.C.

## Ethics in Counseling

Regarding "Kickbacks, Gifts, Sex For Jobs" [CW, Jan. 12] how can a prospective applicant or employer ensure that he is dealing with a reputable placement counselor?

First, let me say that nothing is 100% foolproof. However, in this profession there are rigid certification requirements that a personnel placement counselor can meet in order to become a certified personnel consultant (CPC), a professional designation similar to that of a certified public accountant.

To quote from the National Association of Personnel Consultants' (NAPC) manual for certification: "One of the most compelling needs of the private placement profession today is for the continued development of meaningful ethical and business standards predicated on a body of knowledge unique to placement counseling and services operation. The certification program of the National Association of Personnel Consultants is dedicated to this end. Certification is a sincere effort on the part of NAPC to heighten standards required by the placement profession and stands as the cornerstone from which we meet the challenges of the future."

To become a CPC, a candidate must have a minimum of two years' experience in the private placement profession, be of good moral character and must successfully complete a rigorous series of business situation interviews as well as a written exam on personnel placement operations and state and federal laws and regulations applicable to the private placement profession.

The NAPC, headquartered at 10102 14th St. N.W., Washington, D.C. 20005, handles any problems or complaints that either employers or applicants encounter.

David J. Osgood
Vice-President
Availability Personnel Consultants
Bedford, N.H.

## No Proof

"Kickbacks, Gifts Sex for Jobs" was, in my qualified opinion, irresponsible journalism. No proof whatever was offered to substantiate the allegations made by the author. It is difficult to tell if the article was fact or fiction.

I cannot deny that there may be some unscrupulous employment agencies that operate unethically and even dishonestly. But I can assert, most positively, having been associated for many years with many firms specializing in the placement of DP personnel that those who operate unethically are a miniscule minority. Success in that field depends entirely on earning the respect of hundreds of employers and thousands of candidates.

As head of the advertising agency that handles the account for National Computer Associates, I know all of their people intimately. And I know them to be hard-working, honest professionals. I think it is shameful that the article, with so little basis in fact, cast a shadow over them and indeed over the entire industry because of the possible existence of a few shady characters.

John F. McNamara
President
John F. McNamara Co.
Southfield, Mich.

## About 'FMS-11'

I was pleased with the favorable publicity given to "FMS-11" in the report on the 1980 Datapro Research Corp. survey on proprietary software [CW, Dec. 22]. It should be pointed out that this multikey Isam system is actually a proprietary product of Transcomm Data Systems and serves as the "data base" for our Tolas-II distribution management and financial applications.

It has been licensed to NCA (mentioned in the article as the supplier) and other software companies, as well as to numerous end users. FMS, simply the initials for "File Management System," should also not be confused with Digital Equipment Corp.'s FMS-11 Forms Management System.

Allen L. Pinkus
Vice President
Transcomm Data Systems, Inc.
Pittsburg, Pa.

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# New Capabilities to Change Users' Dealings With DP

*(Continued from Page 41)*

ever, as others reprogram the capability onto cheaper, less specialized hardware.

Similiarly, the idea of "team computers," or of multiwindowed displays, although currently expensively packaged in a way which makes production and sales sense to Apollo Computers, Inc., will be used again and again and will be available on Apple computers and other small systems that any user can easily justify by one or two applications [Taylor Report, CW, Jan. 26].

### Price Not Real Barrier

Price is really only a temporary barrier. True, the cost of some of the new products, such as Apollo "window" systems or the IBM Displaywriter, is still high. But there are other areas where similarly addictive offerings are coming out at very low prices.

For example, an inexpensive data base system called SuperPIMx was written up in the January issue of the Computer Information Exchange's (CIE) *People's Software News*. Sold by CIE, SuperPIMx acts as an electronic accounts analysis pad (which is a pretty addictive idea in itself) and can also store literals as well as numeric values. The sellers recommend it for ordinary office uses, such as producing mailing lables, but go into more details as to its use in helping an eighth grader prepare a paper on American presidents!

The recommended technique is to fill the rows with names of presidents and their families, to include dates of births, deaths, elections and any other items that can be fitted into the microcomputer. Then, after reviewing the data, the user can organize it in convenient ways to support the paper and do one output after another.

SuperPIMx doesn't produce a term paper, of course. This still has to be done manually (although probably using a text editor). But the system does provide a different means for handling the data which can help produce a more complete product.

Cost? The software is just $15.95, or a few cents more in California.

But that is not the whole cost story; it still costs more than $16 to set up a data base. The hardware has to be bought, and while processors are cheap, the costs go up by the time disks and printers are added.

That first unit, while still only the cost of a few typewriters, does have to be justified.

Justification will often come through the ability of various pieces of software to outperform their manual rivals on some unavoidable task. SuperPIMx actually is not a literal data base at all. Most of the software is involved in maintaining defined mathematical relationships between the rows and columns of whatever size matrix your memory can handle. It may *act* as an accountant's scratch pad, but most important, it can ensure mathematical accuracy in a way that no manual analysis ever can. And this, or similar newfound capabilities, can justify that first unit.

There will be specialized products, like the Displaywriter, but almost equally effective versions of the same capability will come from general-purpose systems or from others that specialized for one purpose (like word processing) but allowed to run general-purpose programs, too.

Once one of these adaptable systems has been justified and brought into successful use, the additional cost of other new systems becomes trivial. If the original system is only partly used, the only cost is that of the introductory software — and that can come from petty cash! And even if the original system does need all the workstation's available time, satellite processors can be added. Using the same disks and printer, they can get a good workout for only a fraction of the cost of that first unit.

By then, the user will be accustomed to having his own computer capability, and the DP world will have changed.

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# Stress Results, Not Effort

*(Continued from Page 41)*

"It never failed to work. The only problem with the process was that it took about three months for the paperwork to be completed, because it flew back and forth for 'further clarification' — but it was worth it."

Delaney described his reasons employees fail on the job:

"It's because of the employee's:

"1. Inability to relate to or peacefully work with others.

"2. Inability to handle stress or anger.

"3. Inability to make decisions when required (good judgment).

"4. Refusal to accept authority.

"5. Falling into passivity when things don't go his way.

"Anything else on a job description is 'small potatoes' when compared with the above. I believe that factors of attitude and judgment are acquired early on, in a mother's milk or at a mother's knee, and are not amenable to change. Even though we need better measurement factors, the best we can hope for from a job description is a statement of those areas of work a manager expects an employee to learn and do. For example, have you ever seen job descriptions which deal with the fact that, in any organization, 10% of the people do 90% of the work?"

*Letters from the readers are welcomed. Send them directly to Jack Stone, Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.*

'They're Automating the Whole Prison System.'

## *Structured Tool Retrofits Working Cobol*

LA GRANGE, Ill. — A software tools-based methodology that reportedly allows users to introduce structured methodologies into systems developed without them has been introduced by The Catalyst Corp.

Structured Retrofit is said to mechanically restructure and reformat working Cobol programs that were written and are maintained by a variety of programmers in a variety of styles.

The newly structured code is logically equivalent to the original and produces the same transformation on any set of input data as the original does, a spokesman claimed.

Besides the Cobol structured programming engine that makes the restructuring possible, the package features code analyzers, formatters, a file-to-file compare utility and optimizers.

The service is available at "5% of the cost of a rewrite," a spokesman said, noting that the code formatter is available for $1,800, code analyzer for $13,000 and file-to-file compare for $1,000.

The firm is located at 433 S. Kensington Ave., La Grange, Ill. 60525.

## Cobol Aids Usable ByNonprogrammer

NEW YORK — Software Applications, Inc. has announced two Cobol productivity aids said to boost programmer productivity and to be usable by nonprogrammers.

Codabol reportedly enables programmers to write complete Cobol programs with as few as one or two statements. All Cobol verbs and syntax are said to be valid, yet no file or sort definitions are used or generated.

There is no opening or closing of files or reading of records, a spokesman said. The user changes the OS JCL to redefine file type, record length, blocking factor and sort fields. The Codabase function is said to have all the power of Codabol with all IMS data base functions.

Codabol costs $400/mo per CPU or $560/mo per CPU for Codabol with the Codabase feature. The firm is located in Suite 303 E., Pan Am Building, 200 Park Ave., New York, N.Y. 10166.

## *The Precompiler Alternative — Part 2*

# Precompiler's Efficiency Applies Across Divisions

By Jon Dokken
Special to CW

RED WING, Minn. — A precompiler must efficiently process Procedure Division statements as well as those in the Data Division. For example, most Cobol Procedure Division statements contain a subject and object. Excluding the prefix, programmers tend to propagate the body of the subject in the object data name whenever possible. This procedure makes the statement easier to interpret and saves the time required to create new names.

Example:

```
MOVE ITMMST-DESCRPTN TO PRTR-DESCRPTN.
```

would become:

```
MV ITMMST-DESCRPTN TO PRTR-
```

Certain key words in the Cobol statements could be inserted by the precompiler, relieving the programmer of this redundant chore without sacrificing readability.

*Why use a software tool like a Cobol precompiler? In Part 1 of this two-part series, Dokken outlined how such a package can save programming time when coding the Data Division of a Cobol program. He looks at how a precompiler processes the Procedure Division statements in Part 2.*

Example (precompiler input):

```
MV ITMMST-DESCRPTN PRTR-
PRF CALC-RTN / CALC-RTN-EXIT
```

The TO would be inserted becomes THRU

*(Continued on Page 48)*

# Cullinane Announces Updates

## • *Online Query*

WESTWOOD, Mass. — Cullinane Database Systems, Inc. has announced a number of enhancements to its Online Query (OLQ) data base access software package that it said increase efficiency and ease of use.

OLQ reportedly retrieves information stored in an IDMS data base to format and produce ad hoc reports without complex programming. Its commands can be used to aid in program development, to monitor data base activities and to retrieve information for management and administrative needs, according to a company spokesman.

Features of Release 3.0 of the package include the ability of programmers to view data base records before deciding on terminal screen formats with DISPLAY commands.

The release is also said to provide computational abilities for totals, subtotals, averages, item counts and lowest and highest value notations. It features a "Help" facility for users.

The release is free of charge to OLQ users, a spokeswoman said from the firm at 400 Blue Hill Drive, Westwood, Mass. 02090.

## • *Interact*

WESTWOOD, Mass. — Cullinane Database Systems, Inc. has added several features to its Interact programmer productivity package.

Interact 7.0 offers an on-line text editor with capabilities for remote job I/O and word or document processing, the vendor said.

Additional features now offered under Interact 7.0 include: an interfact to Cullinane's IDMS-DC and IDD data base management system as well as Pansophic Systems, Inc.'s Panvalet and Librarian packages and IBM's JES-3. Run-time options are now included along with IBM 3270 full screen management, SNA/SDLC support, an OS/VS1 internal reader interface, SET/SHOW DESTINATION and SET/SHOW SEPARATOR commands, three-digit remote identifiers, eight character user identifiers, an arbitrary high-level index, three additional user exits and AUTOFORM enhancements.

Interact 7.0 costs $30,000 for the initial license fee and a 10% annual usage fee, the vendor said from 400 Blue Hill Drive, Westwood, Mass. 02090.


# IBM's RMF "126% Off Mark" CW Reports. QCM Needed!

**1/19/81 . . .** Two independent studies reported by Computerworld noted that IBM's Resource Monitoring Facility (RMF) monitoring of CPU and I/O utilization "suggests discrepancies," "severely underestimates," and can cause "inaccurate estimating" of proposed enhancements up to 126%!

### QCM-Quantitative Computer Management

QCM is an accurate resource use analysis system for capacity planning, performance measurement, operator assistance, and resource billing. It is designed for large installations which need reliable information about their operation.

QCM uses event-driven **and** sampling methodologies to capture and present the most comprehensive and accurate data obtainable by any package in the industry. QCM is far more accountable than hardware monitors, conventional sampling software monitors, or RMF/SMF based systems.

The QCM family of computer management products is the most powerful system of performance measurement tools available.

**SPM-Systems Performance Module:** Provides management reports for diagnostic performance measurement, capacity planning and fine tuning.

**SPI-Systems Performance Interrogator:** An online performance and analysis facility for operator and TSO consoles. Contains powerful exception reporting facilities.

**JAB-Job Analysis and Billing:** Most accurate and repeatable accounting and billing system available. Uses QCM methodology to supplement SMF. Flexible allocation and cost distribution.

**BCO-BYTE/SIO Counting Option:** Directly counts IO's and the number of bytes transferred at the job, device, channel and control unit levels—a necessary requirement for anyone seriously concerned about capacity planning, accountability, and system tuning.

### SDSI-Shared Data-Set Integrity

SDSI solves the problems of sharing data between two or more computer systems. It overcomes data integrity problems and reserve lockouts on shared DASD, **without** requiring system or program modifications.

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CW126

# Precompiler's Efficiency Goes Across Divisions

(Continued from Page 47)

replaces the "/" and PRF PERFORM.

In PERFORMed routines, the paragraph name is usually used throughout the routine. Therefore, the EXIT could be propagated with the same name.

Example (precompiler input):

```
PRF CALC-RTN / %-EXIT
```

The "%" sign would be replaced by CALC-RTN and since most paragraph exits end in "-EXIT", the precompiler could insert them as well.

Data name propagation could also be applied to paragraph names. Modular programs contain numerous routines and the name could be saved and propagated as a paragraph is processed.

Example:

```
CALC-RTN.
....
    PERFORM CALC-RTN-ERR THRU
    CALC-RTN-ERR-EXIT.
    GO TO CALC-RTN-EXIT.
CALC-RTN-LP.
....
    GO TO CALC-RTN-LP.
CALC-RTN-EXIT.
    EXIT.
```

would become:

```
CALC-RTN
....
    PRF $-ERR / %
    G2 $¢.
$-LP
....
    G2 $-LP.
$¢ EXIT.
```

The "$" is replaced by CALC-RTN and "-EXIT" is inserted for the "¢" sign. Paragraph name propagation saves both rewriting the name and remembering it.

Data name prefixes are widely used to identify the input or output data file. They should be kept brief but unambiguous. A single numeric character could be used in place of a longer prefix. Most programs access fewer than 10 files. Using the previous example, "0" could be substituted for ITMMST and "1" for PRTR.

Example:

```
MV 0-DESCRPTN 1-
```

And by assigning "0" to the file most frequently referenced and applying zero suppression, the "0" does not have to be written at all.

Example:

```
MV -DESCRPTN 1-
```

Abbreviated statements could also be generated and the precompiler would expand the statement, inserting user-supplied names where appropriate. Indentation and alignment would complete the process.

Example:

```
SELECT ITMMST ASSIGN TO
SYS007-.....
    ORGANIZATION IS INDEXED
    ACCESS IS RANDOM
    RECORD KEY IS ITMMST-KEY.
```

would become:

```
DIR ITMMST SYS007-..... ITMMST-
KEY
```

The first character indicates the device; the second, the type of file organization; and the third shows the access method employed. Other file-related statements in the Environment and Data Divisions could also be generated.

Example:

```
• PRECOMPILER INPUT
  IO
  FS
  PRT xxxxx
• COBOL STATEMENT
  INPUT-OUTPUT SECTION
  FILE SECTION
  SELECT xxxxx ASSIGN TO SYS007-
  UR-1403
```

While some text editors can recognize and replace specified words or character strings, most do not handle columnar realignment of the output. This feature would assure absolute accuracy when replacing words or character strings, and a standardized appearance in the finished product.

Every DP department enforces at lease an informal form of columnar alignment standards, although programmers seem to develop their own individual style. The precompiler should accept input in any format and realign it to departmental standards.

Cobol syntax requirements could also be interpreted by the precompiler. One obvious use would be elimination of the terminating period. Besides literals and PICTURE clauses, the only logical use for a period is to terminate conditional statements and the last statement in a paragraph. The precompiler can determine where periods should be inserted for any other Cobol statement.

Finally, the determinant factor in most business decisions is cost and the small shop should not be penalized for its size and corresponding budget. Therefore, the precompiler must be fairly priced and should be available for a one-time charge or monthly payments. While every DP department may not benefit from a precompiler, those that generate new programs, are involved in conversion, deal with multiple customers or divisional sites, enforce rigorous columnar standards or simply desire to give their programming staff a time-saving tool may find such a product very helpful.

*Dokken is a manager and technical software specialist with Twin Oaks in Red Wing, Minn.*


TP-270
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The TP-270 provides a simple, easy-to-use method of determining network response time and the individual delays that contribute to response time. The device also provides a means of directly measuring the effects of software or hardware changes on the network performance.

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## HP Desktop Adds Enhancements, Bundles Statistics Applications

PALO ALTO, Calif. — Hewlett-Packard Co. has added software, data entry and analysis routines enhancements to its Series 9800 System 45 desktop computers while bundling formerly separate packages together at a reduced price as a Statistics Library.

Included in the package are the following routines previously available only as stand-alone packages: basic statistics and data manipulation, regression analysis methods, statistical graphics, general statistics, nonlinear regression, analysis of variance, Monte Carlo simulation utilities and principal components and factor analysis.

The enhancements include improved data entry, better preanalysis manipulation routines, improved regression analysis routines and improved statistical graphics routines, the vendor claimed.

Required minimum hardware configuration for the Statistics Library includes the HP Series 9800 System 45B desktop computer with 187K bytes of memory, graphics display system, two tape units and an integral thermal printer.

The Statistics Library is priced at $1,500, a $2,000 price reduction from the previous total price, from Hewlett-Packard Co., 1501 Page Mill Road, Palo Alto, Calif. 94304.

## Small Banks Get Finance System

SPRINGFIELD, MO. — A bank financial system for small to medium-size banks or savings and loans running on Digital Equipment Corp. Datasystem 325 or larger is available from Springfield Computer Consultants, Inc. Memo posting and inquiry capabilities are also available.

The one-time license fee for the product is $20,000, the vendor said from 3952 S. Fairview, Springfield, Mo. 65807.

## Course to Update Cobol Skills

WALTHAM, Mass. — "Contemporary Cobol for Practitioners," a seminar reportedly designed for experienced programmers who want to update their Cobol skills with classroom and laboratory experience, will be offered by Bentley College here.

The seminar will be held on three consecutive Saturdays — March 14, 21 and 28 — at a cost of $300 per participant.

Bentley College's Center for Continuing Education is at Beaver and Forest streets, Waltham, Mass. 02254.

*Advertisement*

# DP Dialogue

Notes and observations from IBM that may prove of interest to data processing professionals

## Engine Development Revs up With Low-Cost Online Simulation

Online simulation at an affordable price has helped Mechanical Technology Incorporated, Latham, New York, to reach its goal of becoming the U.S. leader in the technology of Stirling Cycle engines. The company recently installed an IBM 4341 Processor, and engineers can now interact directly with a detailed model of the engine in the computer, through the use of IBM's Virtual Machine/Conversational Monitor System (VM/CMS).

"Compared to our previous use of outside services for computing, we've lowered our costs while gaining important capabilities," says Don Castor, manager of the data processing center. "For example, a programmer now has a full-screen editor and can directly change a program through a terminal.

"The 4341 allows us to distribute terminals to all the people who need them. It has placed interactive computing within our means for the first time."

The Stirling Cycle engine is a 160-year-old invention that Mechanical Technology is developing for practical modern use. The kinematic engine has exciting potential for automotive power, and the free-piston Stirling has a wide range of applications. The company has already tested baseline Stirling engines installed in three modified passenger cars. A newly designed automotive Stirling engine will be available for testing shortly.

Development of the engine to its full potential is a formidable challenge, explains Roy Krasse, manager of administration, Stirling Engine Systems Division. "With many variables to manipulate, we would like to build and test 200 automotive engines; actually we'll test eleven. As an alternative, we use computer simulation."

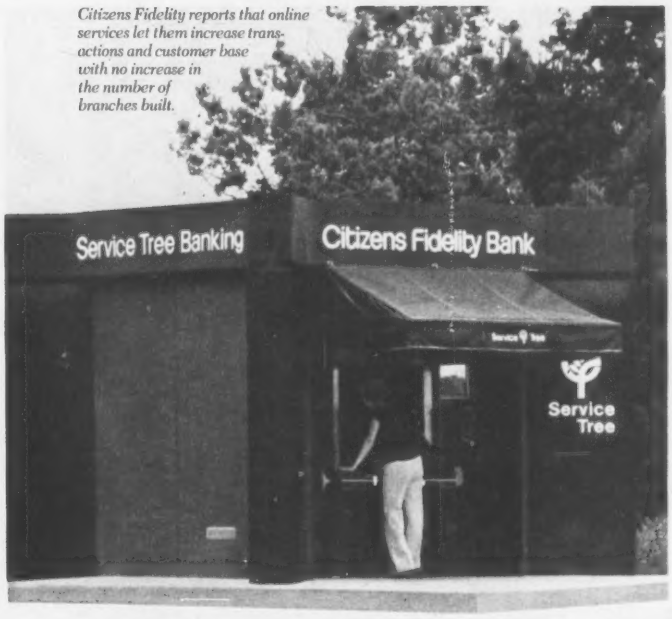
Each user enters test variables through one of 23 IBM 3278 Visual Display Stations, and sees the results of the simulation on the screen in seconds. "An engineer can change a parameter and rerun the simulation immediately," Krasse says. "He has better control—he doesn't interrupt his train of thought. The model, or any other engineering program, is available online. An operator needn't load it from tape."

"We've been able to process more requests for application development," Castor adds. "With only about 2½ people programming, it took just four months to convert 700 programs. Today we do in one shift what once took a full three shifts.

"And data entry is now online—entered by the users at the source under CMS—which saves us a lot of manhours and greatly reduces the error rate."

*Technicians tear down a prototype free-piston Stirling Cycle engine. With an IBM 4341 Processor, Mechanical Technology Incorporated can present an online computer model of the engine to designers through 23 terminals.*

## A Louisville Bank Goes Where the People Are




*Citizens Fidelity reports that online services let them increase transactions and customer base with no increase in the number of branches built.*

A bank in Louisville, Kentucky, believes that more depositor transactions will soon be performed in non-banking locales.

Says Frank M. Knego, senior vice president of Citizens Fidelity Bank & Trust Company: "We need some fundamental changes if we are to offer consumers the convenience they expect. It costs too much to build new branches and to extend banking hours. We chose the alternative—customer-operated services off-premises, through an online banking system—and we haven't had to increase the number of branches since 1975.

"We've also cut back hours in 33 branches. We had been feeling pressure for Saturday banking, but we've been able to meet that demand with electronic funds transfer (EFT) instead."

In addition to the 16 IBM 3614 Consumer Transaction Facilities online to its IBM 3033 Processor, Citizens Fidelity worked closely with local merchants to develop point-of-sale (POS) service.

Depositors can now withdraw and deposit money, as well as pay for their purchases, through in-store IBM 3608 Point-of-Sale Terminals. The customer simply inserts a plastic card and keys in the dollar amount, Knego explains. The terminal produces a printed slip that the depositor hands the store clerk, who then accepts the deposit or pays out the withdrawal.

"Everyone gains," Knego points out. "We pay merchants to handle our EFT service, although we charge them to process paper checks. The funds are transferred to the stores' accounts immediately, rather than after a check clears. Surveys show that EFT users make significantly higher average purchases than they did before.

"The merchants gain in goodwill by offering the service. And withdrawals help them dispose of surplus cash.

"For the depositor, there is the convenience of one-stop banking and shopping. Banking hours are more flexible. And we've found that many depositors prefer to do their banking in neighborhood convenience stores.

"The bank has avoided new construction and longer hours. The cost per transaction is declining steadily as the volume of EFT activity increases. And a survey showed that our best EFT customers maintain higher balances and write 35 percent fewer checks.

"And, most importantly, the EFT program has allowed the bank to be innovative in its approach to the distribution of banking services.

"Rather than bring people to the bank, we are bringing banking to the people."

*DP Dialogue is designed to provide you with useful information about data processing applications, concepts and techniques. For more information about IBM products or services, contact your local IBM branch office, or write Editor, DP Dialogue, IBM Data Processing Division, White Plains, N.Y. 10604.*

IBM
DATA PROCESSING DIVISION

# System/34 Users Gain Program Time Control

WEST LINN, Ore. — CRS West, Inc. has developed a program time control system for IBM System/34 users which reportedly can improve response time and throughput of other jobs on this system.

Qwicii gives the System/34 user several functions not available through standard RPG-II Cobol and assembler coding. Users can specify a program or procedure start time, a program stop time, a wait time cycle and a process time cycle.

The system is composed of an assembler subroutine exit and several RPG-II control programs. The exit is written using IBM's Basic Assembler and Macro Processor. Coded functions adhere to IBM's language conventions.

There is a $600 one-time charge for the Qwicii system. CRS will send a 60-day trial version on a type 1 diskette (which is theirs to keep) to anyone inquiring about the system. The vendor is located at 18740 Pacific Highway, West Linn, Ore. 97068.

# Tool Tracks Portfolios

NEW YORK — A portfolio management system for IBM System/34 computers is available from Mitchell A. Finks Associates, Inc.

The system was designed to serve mutual funds or registered investment advisors. It is presently used to control varying amounts of activity including over 40,000 tax lots, 2,200 clients, 4,000 securities and 500 trades per day, the vendor claimed.

Portfolio Valuation can be triggered automatically and by special request. The accounts are identified and the holdings file is searched for the appropriate records, which are summarized and used to produce the report, a spokesman said.

The price for the system is $28,000, the vendor said from 5 Baldwin Place, New York, N.Y. 10956.

## Wholesaler Aid Fits System/34

AMARILLO, Texas — Integrated Beverage Systems, Inc. is offering Version III of its integrated software package for beer wholesalers and soft drink bottlers that use the IBM System/34.

For the beer wholesaler, the package includes financial reporting, balance sheet, income statement, payroll, accounts receivable, accounts payable, automatic journal posting and inventory control.

For the soft drink bottler, it provides a production package including bill of materials flow, variance from standard cost and actual floor cost of brand by package.

The package costs $10,000 with a $10,000 installation charge that includes six weeks of training. A $250 monthly support and enhancement fee is available. The vendor can be reached through P.O. Box 15028, Amarillo, Texas 79105.

# *Distribution, Finance Tools Debut for System/34*

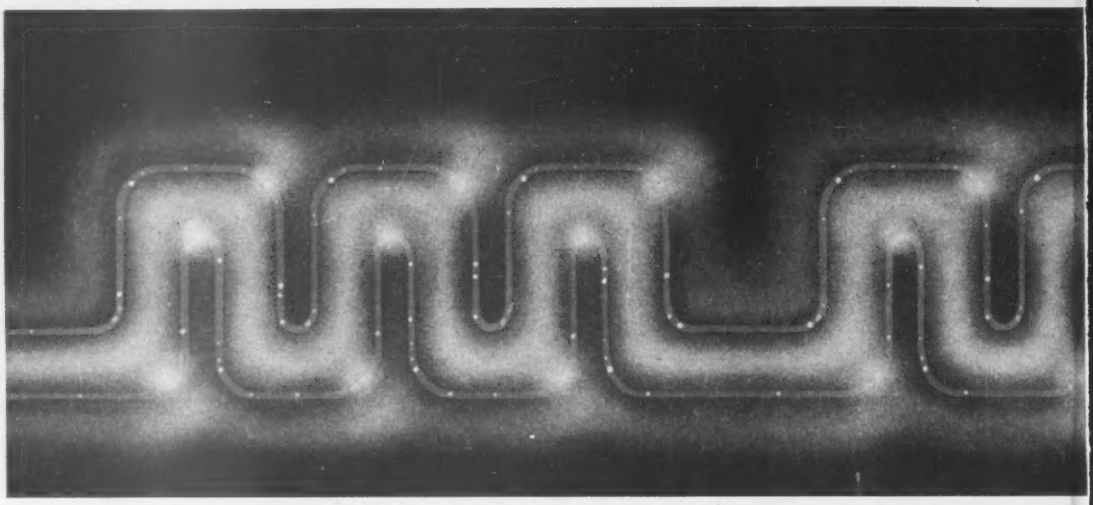
MILWAUKEE — A Distribution Management System and a package of financial applications designed for the IBM System/34 have been announced by the Harris Data Service, Inc.

The Distribution Management System, designed for the welding supply distributor industry, includes 15 master files, billing programs, handling of charges and cash sales and rental demurrage, the vendor said.

The financial applications systems include general ledger, accounts receivable, accounts payable and payroll, the vendor said. System features include complete package integration, the vendor claimed.

The Distribution Management System is priced at $8,000, with the financial applications systems priced at $4,000 for general ledger, $2,500 for accounts receivable and accounts payable and $1,500 for payroll.

Harris Data Service, Inc. is headquartered at 11629 W. Dearborn Ave., Milwaukee, Wis. 53226.



Information management's expanding vistas.

# Cobol Converter Fits Medium Burroughs CPUs

BUFFALO, N.Y. — Dataware, Inc. is offering a Cobol syntax converter for those Burroughs Corp. "medium systems" users converting to IBM.

Most of the conversions center around Burroughs B2700, B3700 and B4700 series, with the target environment being 4331-Group 2 or 4341 using OS/VS1.

For the syntax conversion, Dataware uses a proprietary software system to handle the language differences between the vendors.

The package produces a new Cobol source module along with a conversion worksheet. Changes noted are applied to the new Cobol module, the vendor said.

### Tests Conducted

Once a clean compile is obtained, the necessary JCL and data files are prepared for use on the target environment and are then tested.

Additional software aids are available to verify the results and monitor the percentage of source code executed during the test. This is followed by a system test and then the application is run in a parallel mode for a designated period, the vendor explained.

The overall cycle is followed for each application being addressed and sometimes involves multiple systems being converted simultaneously.

The conversion software can be licensed for $4,800 a year. Full conversion services range from $80,000 to $500,000, the vendor said.

Dataware, Inc. is headquartered at 2565 Elmwood Ave., Buffalo, N.Y. 14217.

# Raxco Updates 'Rabbit-2' For PDP-11, VAX-11/780

W. PALM BEACH, Fla. — Raxco, Inc. has announced Release 2.0 of Rabbit-2, a computer performance analysis system for Digital Equipment Corp. VAX-11/780 and PDP-11/70 minicomputers.

There are several new commands. PROFILE provides a statistical analysis of user resource demand; RATIO displays resource consumption per connect hour or per second; RANK lists users in order of demand; WHO provides user lists for a relevant time period; and HELP lists over 30 commands and associated formats.

An option available under RSTS is the ability to determine the percentage of time users spend in various states, such as RUN, SLEEP and TERMINAL I/O. Another option for both VMS and RSTS is program efficiency analysis, whereby individual program statistics are generated. The program is identified and frequency plus quantity of usage are developed.

Rabbit-2 costs $99/mo or $2,495 for a permanent license. Raxco is located at 3336 N. Flagler Drive, W. Palm Beach, Fla. 33407.

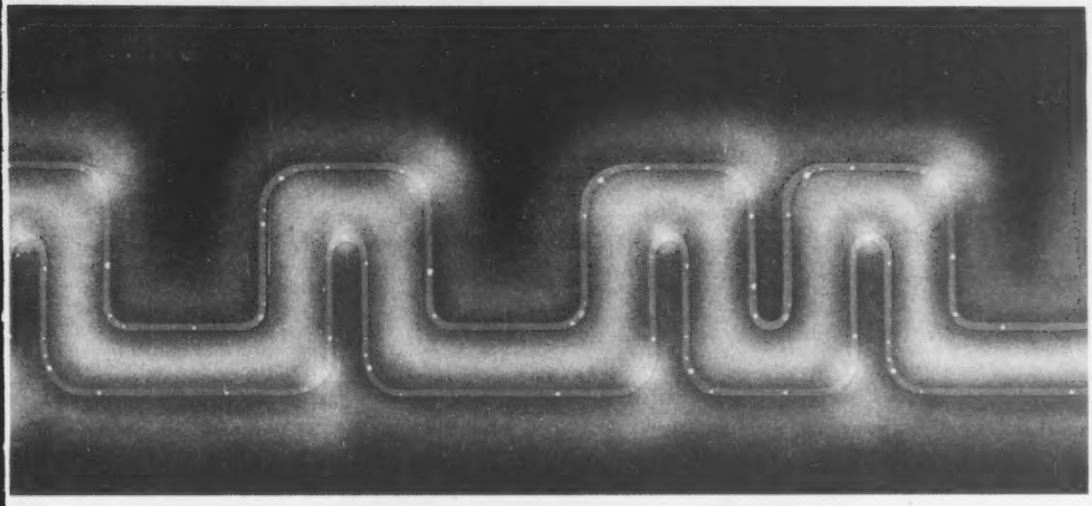
# Prime Users Get 'Tracts'

PHOENIX — A complete software package for air-freight, bus and truck transportation applications has been developed jointly by Intercept Ltd. and Database Systems Corp. for use on Prime Computer, Inc. systems.

Transportation Rating Accounting Controls and Tracing Systems (Tracts) handles transportation applications ranging from a Bus Passenger module to an LTL TL Truck module.

Each module provides for on-line rating, freight bill or passenger ticket generation, tracing and subsequent on-line access to management reports. Tracts also enables the user to obtain in batch mode an unlimited assortment of management reports.

The bus freight module of Tracts costs $100,000. The truck shipper module runs about $60,000 and the airline system begins at $100,000. Tracts also is available on a time-sharing basis. Further information can be obtained from the vendor at Suite 201, 1846 E. Camelback Road, Phoenix, Ariz. 85016.



Dataphone® digital service, the nation's largest and best-serviced network of its kind, greatly extends the capability of the Bell System communications network—already the world's most advanced information management system. And Dataphone digital service continues to expand.

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## System/38 Gets 'GAS'

MINNEAPOLIS — Lawson Associates has unveiled General Accounting Software (GAS) for the IBM System/38. The integrated package consists of six accounting applications: general ledger and report writer, accounts payable, accounts receivable, payroll, fixed assets and purchase order.

Each module can be installed separately or used with any of the other segments, the vendor noted.

The software includes documentation, source code, on-site installation and training for each application.

Each module costs between $6,000 and $8,500, the vendor said from 2021 E. Hennepin Ave., Minneapolis, Minn. 55413.

## Five-Day CICS Training Offers On-Site Workshops

ARLINGTON, Texas — Analysts International Corp. is offering five-day, on-site programmer training in command-level CICS reportedly featuring a combined class and workshop employing a building block approach with hands-on program exercises interdispersed with lectures.

The training was designed to simulate realistic on-line program requirements by which the students will design, debug, code, test and successfully execute their own on-line programs.

The price of the training is $6,000 per class, with a recommended class size of 12 students and smaller class sizes available from Analysts International Corp., 1201 N. Watson Road, Arlington, Texas 76011.

## Translator Debuts

MILWAUKEE — Dasd Corp. has announced an IBM System/3 to IBM CICS/VS Cobol translator that automatically converts all interactive System/3 RPG CCP programs to corresponding CICS/VS command-level Cobol programs.

The package also converts the System/3 display format facility (DFF) screen definitions to CICS/VS basic mapping support (BMS) screen definitions, the vendor said.

The installed package costs $24,800. However, per-line and per-program rates are also available, the firm said from 9045 N. Deerwood Drive, Milwaukee, Wis. 53223.


# Now you can watch your four favorite programs...

The new HP 2626 display station will give you a view of your computer system you've never seen before.

It lets you divide the screen into as many as four separate "frames," each attached to a different workspace in the terminal's memory. You can check a program listing in one frame and access a file in another. Fill out a form in one workspace while the computer loads the next form into another. Or do text preparation and editing in adjacent frames.

What's more, you can set line lengths of up to 160 characters in any workspace. Then scroll horizontally to get the entire picture. (The built-in thermal printer includes a compressed mode that prints up to 132 characters per line.) Scroll vertically, too, or change the size of the frame at the touch of a key.

**Split decisions.**

The HP 2626 has two data communications ports instead of one, so you can hook up the terminal to two computers at the same time (or to the same one twice). Then, it's like getting a multi-tasking capability right in the terminal—your systems designer can compile, execute, monitor and edit programs as if two stations were available.

# ...same time, same station.

And while your user is filling out a form, the terminal can be sending data from the previous form to a computer. And down-loading the next form into an adjacent workspace. By smoothing out the "type and wait" of data entry, you can take advantage of less expensive, low-speed transmission lines without sacrificing the efficiency of your operator. The result? You'll get more out of the entire system.

If you'd like to watch a program on the new HP 2626 display station, or any of our terminals, just call your local HP sales office listed in the White Pages. You can also write for more information to Hewlett-Packard, Attn: Tom Anderson, Dept. 389, 974 East Arques Ave., Sunnyvale, CA 94086.

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☐ Yes! I'd like to find out more about the HP 2626 display station. Please send me your brochure.
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Mail to: Hewlett-Packard, Attn: Tom Anderson, Dept 398, 974 East Arques Ave., Sunnyvale, CA 94086. CW 2/23


## SDI's 'Epat' Backs FBA

SAN MATEO, Calif. — Support for IBM's fixed-block architecture (FBA) has been incorporated into SDI's Epat tape management and control system, the company has announced.

The FBA enhancement allows Epat to take advantage of FBA technology for storage of the data set catalog data base, the vendor said. FBA devices, count key data (CKD) devices or a combination of the two can now be utilized to store the data base describing an installation's tape data sets, the vendor said.

The FBA enhancement is available to Epat users at no extra charge from SDI, 2855 Campus Drive, P.O. Box 5801, San Mateo, Calif. 94402.

## Accounting Tool Fits IBM 5110

MOUNT CARMEL, Conn. — Southwater Corp. has announced accounting software for periodical publishers using IBM 5110 and 5120 small business computers.

The Southwater Advertising Accounting System reportedly handles a full advertising accounting process.

The package costs between $4,000 and $14,000 depending on options, the vendor said from 2348 Whitney Ave., Mount Carmel, Conn. 06518.

## Olamic Providing Software Grants

BAY CITY, Mich. — Academic and nonprofit research institutions are being invited to apply for one-year, renewable grants to use Olamic Systems Corp. software.

Potential grant recipients must submit a statement of financial need.

Organizations interested in applying should contact Olamic at 503 North Euclid, Bay City, Mich. 48706.

*Written in Pascal*

# Eclipse, PDP Get Virtual Memory

MIDLAND PARK, N.J. — Giordano Associates, Inc. has announced a virtual memory package for Data General Corp. Eclipse and Digital Equipment Corp. PDP-11 processors.

Called VM, the package is written in Pascal and reportedly circumvents most of the problems encountered with Pascal's standard I/O in real program practices.

**Buffering Concerns**

VM allows the user to deal with up to 10 files of arbitrary size without concern for disk I/O and buffering, the vendor spokesman explained.

The package currently runs on Data General's AOS operating system and DEC's Unix, RSX-11 and RT-11 operating systems, the vendor spokesman said.

The package costs $350 for the first processor and $50 for each additional CPU.

Giordano Associates, Inc. is headquartered at 629 Godwin Ave., Midland Park, N.J. 07432.

# Finance Tool Fits HP 3000

CHICAGO — The FCS-EPS financial evaluation and planning system from EPS, Inc. is now available on Hewlett-Packard Co. 3000 computers.

The system is already in use on IBM, Honeywell, Inc., Burroughs Corp., Sperry Univac, Data General Corp. and Amdahl Corp. computers, the vendor claimed.

The system is a three-dimensional system that can work models and scenarios into a hierarchical consolidation structure, plug in variables for "what if" analysis, provide long-range projections and produce cross-sectional reports and financial graphics, the vendor said.

The system also automatically adjusts currency conversion and individual inflation rates, the vendor spokesman added.

Costing between $35,000 and $50,000 depending on modular options, FCS-EPS is available from EPS, Inc. at 8600 W. Bryn Mawr Ave., Chicago, Ill. 60631.

# Analysis Package Boosts ICP/5000

NORWALK, Conn. — Perkin-Elmer Corp. has announced an analytical package that enhances the performance of the firm's ICP/5000 system.

Called the Graphics Display, the package allows an operator to display a sample spectrum on the system's CRT screen and manipulate data to identify potential spectral interferences and to initially determine the optimum wavelength and background correction intervals for the analyses, according to a vendor spokesman.

The ICP/5000 costs $60,200, the vendor said from Main Ave., Norwalk, Conn. 06856.

# Legal Package Fits Burroughs WP

NEW YORK — Burroughs Corp.'s Office Systems Group has announced a legal billing and management package for its R II and R III word processors.

Features include case view reports, a client summary feature and case type analysis.

The package costs $4,000, the vendor said from 95 Horse Block Road, Yaphank, N.Y. 11980.

# *Remote Diagnostics Geared to Modacs III*

FORT LAUDERDALE, Fla. — Modular Computer Systems, Inc. is offering software that provides remote system diagnostics for its Modacs III real-time subsystems.

Oriented to the distributed processing environment, the software supports configurations where a remote system may be unattended by an operator and require testing or in a situation when the remote system is in an environmentally hostile location where operators and peripheral devices are not practical, the vendor said.

Specific tests may be selected for execution.

Capable of running on all Modcomp CPUs, the software media charge on magnetic tape is $275 from the vendor at 1650 W. McNab Road, Fort Lauderdale, Fla. 33310.


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## Finances, Graphics Mixed

PITTSBURGH – A business graphics system that reportedly combines a financial modeling application with the capabilities of a graphics system is available from On-line Systems, Inc.

Foregraph is a combination of Foresight, the vendor's financial modeling tool, and Tel-A-Graf, a graphics system developed by Integrated Software Systems Corp.

Foregraph can produce numerous types of graphics displays using six color options. Information can be displayed with straight or stepped line curves, with clustered or stacked vertical and horizontal bar graphs or with pie charts.

The software costs $14,000. On-Line Systems, Inc. may be reached through P.O. Box 8551, Kansas City, Mo. 64114.

*Edit Option Offered*

# Transactions Added to 'Insight'

MOUNTAIN VIEW, Calif. – Release 12/80 of Insight, which links V/3000, Hewlett-Packard Co.'s terminal management system, and Image, its data base management system for the HP 3000, is available from Computing Capabilities Corp.

Major enhancements to the basic software include two transaction types that will run a program or stream a job, the vendor claimed.

In addition, function key labels display (available with MPE 2028) is supported at run time on Release 12/80, the vendor said.

**'Dbedits' Facility**

A facility called Dbedits provides access to any number of data sets from a single V/3000 form for editing and displaying data, eliminating the need for most custom coding by Insight users, the vendor claimed.

The one-time license fee for the product is $6,500.

The optional Dbedits facility costs $1,500, the vendor said from Suite 412, 1101 San Antonio Road, Mountain View, Calif. 94043.

# 'FDR' Program Gains CPU Time Boost Option

CLIFTON, N.J. – Innovation Data Processing, Inc. has announced an option to its Fast Dump Restore (FDR) program which reportedly has shown a 10% to 30% improvement in CPU time when compared to Data Set Functions (DSF).

**Remote Queuing**

The Automatic Backup Recovery (ABR) option provides the user with a remote queue capability to dump and restore data sets and utility support for both batch and TSO users while providing complete volume, data set, archive and catalog reports, the vendor spokesman said.

ABR can also reconstruct a destroyed disk volume by automatically calling for the correct tapes required to do the reconstruction, the vendor claimed.

ABR is available to current FDR users for $5,000 per CPU.

Innovation Data Processing, Inc. is headquartered at 970 Clifton Ave., Clifton, N.J. 07013.

# PBS Affiliates Offered Fund-Raising Packages

SYRACUSE, N.Y. – Two applications programs targeted at Public Broadcasting System (PBS) affiliate stations and reportedly providing the user with on-line interactive tools needed to increase fund-raising productivity are available from Wilson Microsystems, Inc.

Written in Ansi-74 Cobol for Data General Corp. Nova and Micronova minicomputer systems, the Membership Control System (MCS) and the Auction Control System (ACS) maintain performance statistics pertaining to on-air fund raising campaigns in addition to automatic data handling procedures, the vendor claimed.

The systems can also be interfaced with financial and accounting software available from the vendor.

The systems are priced at $12,500 each, or $20,000 for the two.

Wilson Microsystems, Inc. is at 290 Elwood Road, Liverpool, N.Y. 13088.

# HP 9845 Gets Stock Tools

HUNTSVILLE, Ala. – Cyberengineering Corp. has introduced stock market analysis and time series analysis packages for Hewlett-Packard Co. 9845 desktop computers.

The stock market analysis line is based on the work of popular stock and commodity traders and advisers.

They allow users to direct the investment of IRA and Keough plan funds through technical market methods. The packages cost between $25 and $2,500, the vendor spokesman said.

Cyberoracle is available for model identification and forecasting of univariate time series.

The package uses a deterministic approach similar to the Box and Jenkins philosophy of stochastic time series analysis. The packages cost between $750 and $3,000. The vendor may be reached through P.O. Box 4143, Huntsville, Ala. 35802.

# Tool Manages Small Trusts

BLOOMFIELD, Conn. – Data Decisions, Inc. is offering a trust automation package designed for smaller trust operations.

Called Trustpac, the package offers account file maintenance, assist file maintenance, tickler reports, daily transactions and income reports.

Packages cost from $40,000.

Data Decisions is at Corporate Place, 4 Barnard Drive, Bloomfield, Conn. 06002.

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**CICSFLOW** — Provides a trace table showing what paragraphs a COBOL CICS program executed before it abended or requested a dump. It is a precompiler which works on MACRO or command level. In a multitasking environment, CICSFLOW shows the task associated with each paragraph. It removes a lot of the mystery from CICS debugging and saves many hours of digging through core dumps. CICSFLOW paid for itself the first week in one shop. $99 one-time charge.

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# Writing Your First Book: A Primer for DP Professionals

BY JACK B. ROCHESTER

"It's clear that electronic technology is going to change the world much more than the motorcar did," said James Martin in a recent interview with *Computerworld* [*CW Extra!* Sept. 18]. New products, systems and technologies are appearing with astounding frequency and with them the need to apply and understand them in a myriad of situations and applications.

You have probably thought of, or implemented, some new techniques and ideas yourself. People in every area of computer technology need information beyond what user manuals and trade journals offer, and they often have to create the information themselves. As the need to disseminate this information to others arises, many publishers are beginning to respond with books and monographs focusing on specific subjects. The 1980s will certainly see a proliferation of published information beyond what vendors customarily provide.

Who will write these books? Professionals like you. The process of turning your ideas into a published book is by no means mysterious, but it has some very clear-cut steps and procedures which, if you learn and apply them, will make your publishing experience enjoyable and profitable.

Having your book in print is an exhilarating experience. Yet it has dividends that go beyond the pride of seeing a bound volume, your name on the spine, resting on your bookcase. It draws favorable attention and merit from your colleagues and your superiors. It can lead to promotion or advancement. It brings your company prestige and accolades.

A book establishes your credibility as a leading thinker and educator. It allows you to share knowledge and create new channels of communication. And, of course, there are the royalty checks!

### Getting Started

With about 40 publishing firms marketing books in computer science, there is certainly one that will be interested in your work. There are technically oriented houses such as QED Information Sciences, Hayden Publishing Co. and Hitchcock Publishing Co. Dilithium Press, CBI and Byte specialize in certain trade areas. Many publishers, such as Science Research Associates (SRA) and Mayfield and Wadsworth, Inc., market college textbooks. Prentice-Hall, John Wiley & Sons and Addison-Wesley are broad-based houses which have both trade and college divisions.

Judith Applebaum and Nancy Evans, in their book *How to Get Happily Published*, said, "It is largely within your power to determine whether a publisher will buy your work and whether the public will buy it once it's released." How so? Well, most publishers select manuscripts in pretty much the same way.

*People in every area of computer technology need information beyond what user manuals and trade journals offer, and they often have to create the information themselves. The 1980s will certainly see a proliferation of published information beyond what vendors customarily provide. Who will write these books? Professionals like you.*

You begin by submitting a proposal and outline stating your intent to an editor who evaluates them in terms of editorial needs. Say, for example, you want to write a book on teleprocessing monitors. The editor will know if the topic is viable, will determine whether the publishing house can market such a book profitably and ascertain if it has any other similar projects under consideration or already under contract.

Once these matters are determined, and if your idea, approach and writing ability appear suitable, the editor will probably have one or two technical reviewers evaluate your proposal. These reviewers are working professionals, leading consultants, college professors and other types of advisers the editor relies upon for their opinions.

If the reviews are favorable, the editor will offer you publishing agreements, which specify the subject, length and due date for the completed manuscript. While you are writing, the manuscript may be reviewed several more times. Once completed, it will be turned over to a production team for copy editing, typesetting, art rendering, design and production work. Then it's off to the printer, where it emerges as a bound book. By this time, marketing and advertising have begun and, if your book sells well, it means nice kudos and handsome royalty checks for you.

Write about things you know best. What is your area of specialization and what unique things do you know about it? Whether it is data base, telecommunications, office automation, programming or DP management, consider what you know and what might be of interest to others. You might have one idea or several; test those ideas out.

Talk to your colleagues and explore ideas, tools, techniques, approaches. Read the journals and trade magazines for other ideas and substantiating information. It is important not only to *verify* your idea, but to refine it and develop its unique focus. You wouldn't want to write an entire book on new uses for the Hollerith punch card.

One author continually heard and read about problems DP departments experienced with quality assurance. He discussed the situation with a number of people, distilling the best thoughts, methods and approaches. He also obtained some valuable information from a study of quality assurance practices. The result was a carefully researched, well-written and much-needed book, hence a best seller.

### The Proposal

Once you have developed and refined your idea, begin a prospectus and outline. The prospectus, or book proposal, serves two purposes: First, it aids you in getting your idea clearly and cogently on paper, so that you know precisely what you want to write about. Second, it explains your intentions to the publisher.

Depending on where you live, most if not all your contact with the publisher may be by mail or phone, so the proposal takes the place of a personal interview. A strong, well-written proposal can sell your book idea persuasively to the publisher. This, in turn, makes it that much easier for the publisher to sell the book to the buying public. This, then, was the point Applebaum and Evans were trying to make.

Let's take a look at the components of a good book proposal and see what each of them is designed to accomplish.

- **The Project Description.** Describe the subject of your book, explaining what is unique or particularly useful about its approach. This section should range in length between one or two paragraphs and a page or so, but take as much space as necessary to properly explain your project. Your goal is to convince the editor that the subject is viable and that you understand it so well you could write a book about it.
- **Outstanding Features or Learning Devices.** There are many ways to enliven a book's manner of presentation — illustrations, case studies, chapter objectives, review questions, suggested applications, a glossary or problems to solve, to name a few. You might have some ideas of your own, and you and your editor might develop a few more together. These features can mark the difference between just another book and an outstanding one. One author found interesting quotes from *Bartlett's Familiar Quotations* for

*(Continued on In Depth/2)*

IN DEPTH

*(Continued from In Depth/1)*

chapter openings: another with a keen sense of humor wrote limericks to explain certain techniques.

• **The Market.** Describe who will be interested in the book — for example, senior programmers, systems analysts working with an IMS/VS data base management system or supervisory management. If there are other similar books on the market, list them by title, author and publisher, including date of publication. Briefly describe each book's strengths, weaknesses and how yours will be superior.

• **Mechanical Considerations.** Give the approximate manuscript length, either in word count or number of pages (each typewritten, double-spaced page is approximately 250 words). If you plan to include illustrations, list how many and what type (graphs, charts, photographs, drawings).

• **Manuscript Schedule.** Describe how much work you have completed on the project, either in research or actual writing, and your estimated date for completing the entire manuscript.

• **Your Credentials.** Explain why you are qualified to write this book by describing your education and training, research and development projects, firms you have worked for, number of years' experience and any other writing you have done. By all means include your most recent resume.

Your proposal should be accompanied by a complete table of contents and a detailed outline, broken down by main topics in each chapter. In addition, enclose one or more sample chapters that demonstrate your technical knowledge and writing ability. While sample chapters are not necessary for an editor to express interest, few will offer agreements without seeing evidence of your writing ability.

Remember, the more thoughtful and complete your proposal, the easier it is for the publisher to make a decision on its merit.

A cover letter adds a professional touch to your proposal. Keep it concise, but add a detail or two not covered in the proposal. Be sure to give your phone number and any special instructions on how to reach you. To ascertain interest in your project, you might want to phone the editor prior to mailing your proposal. This also allows you to direct the cover letter to the editor by name, thus establishing valuable personal contact.

### Writing: The Work Begins

Sylvia Auerbach, noted author and journalist, offered this advice in a recent interview with *Computer Decisions:* "[Writers] should start with the assumption that it's difficult work and that even professional writers find it difficult. It's not because they can't write . . . but because it isn't the easiest thing in the world to do. Armed with that knowledge, they won't get immediately discouraged."

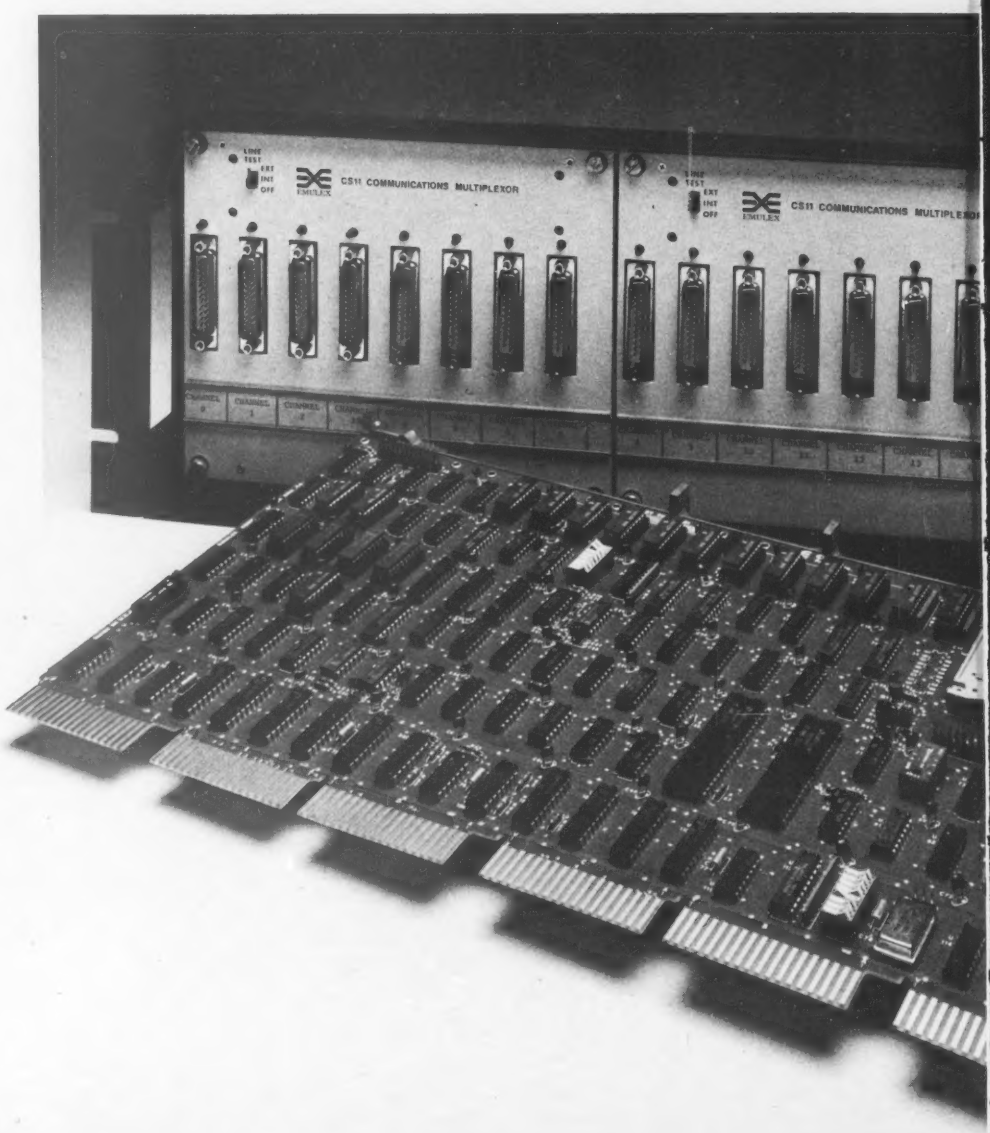
Having prepared a thoughtful prospectus and a thorough outline certainly helps your writing proceed more smoothly. But the first page is not always the best place to start. The first chapter, being introductory, is often easier to write later or even last. Most writers find it makes more sense to begin with an actual content chapter, and editors and reviewers prefer to read material which demonstrates your command of the subject matter.

So, armed with your outline, a cup of coffee and a fresh sheet of paper in your typewriter, it is time to turn those ideas into words, paragraphs and chapters. How to begin? What constitutes good writing? *Readability* and *interest* should be your goal. There is real excitement in reading a book when the ideas make sense and are presented interestingly. It makes you want to jump up and try out the author's ideas yourself.

There is nothing magical about this; the writer worked long and hard to achieve this clarity. James Martins are made, not born. You can do it, too. Let's take a closer look at how you can create readability and interest in your writing.

Your outline should provide the skeleton for each chapter, with each idea building logically upon the next. This is called *coherence.* The more important topics should be given the most attention. Break the material down into manageable portions, then create building-block links between them, from the more simple to the most complex, with the goal of expanding the reader's understanding.

Improve your communication



# WRITING YOUR FIRST BOOK

IN DEPTH

The first sentence of the paragraph should, in essence, explain what the paragraph deals with. This concept, or term should be identified and immediately defined. For example:

*What is a data base?* It is a system which collects and stores data used to operate a business which can be retrieved or drawn from for later use. While the data is stored, various manipulations, conversions or calculations can be executed within the data base. This produces an output which, at the time, and in such a way, is more useful than it was originally.

Always strive for clear, simple language. Use concrete words so readers can make relationships as they read. The computer industry abounds with jargon and technical terminology, and while some of it is necessary, don't use it as a short cut to clear explanation.

Some writers think that four-syllable words and long, convoluted sentences mark good writing. Not so. Writing is like any other system: the more simple and easy to understand, the more efficient it is. Strive to make your sentences do the most work with the fewest words.

E.B. White recounted this story of his college English professor, Will Strunk: "When he delivered his oration on brevity to the class, he leaned forward over his desk, grasped his coat lapels in his hands, and, in a husky, conspiratorial voice, said, 'Rule Seventeen. Omit needless words! Omit needless words! Omit needless words!' " Strunk had gathered his ideas on writing into a small, self-published volume which, years later, White was to revise and coauthor. Now in its third edition, *The Elements of Style* has sold several million copies. I highly recommend this 85-page paperback to any serious writer.

Involve your reader by speaking directly to him. Instead of saying, "It has been the author's experience that . . .," say, "My experience has been . . ." Use the active voice whenever possible. Replace, "It is the purpose of the data base to provide information . . .," with, "The data base provides information . . ." In addition to being clearer, you have shortened an 11-word sentence to four words.

### Define Terms

Each time you use a new term, define it immediately. Make sure your reader knows what you are talking about. You are writing to communicate with a specific group, and the tone, level of complexity and amount of detail should reflect this.

Enhance your concepts and ideas by providing illustrative examples. Stories, anecdotes and applications create pictures in the reader's mind and aid in retention and understanding. Let's illustrate our previous example:

*What is a data base?* It is a system which receives and stores various data, such as inventory, personnel and accounting, necessary to operate a business. Depending on the computer in use, this data is usually in auxiliary storage, such as magnetic disk or bubble memory. While stored, it can be manipulated, or conversions or calculations can be executed, which make the data more useful than in its original form. For example, accounting could learn how many parts are in inventory, and order processing could learn the cost per part, by sharing common inventory information in the data base. This eliminates *data redundancy*, which occurs when many departments keep the same or similar information in separate file records. A data base provides information in a more useful way to management.

Note how much more meaningful and interesting the example has become. Terms have been defined when introduced; illustrations make the business come alive; data base operation has become real ("output," an abstract word, has been replaced by "part," a concrete word); and we understand the whats and whys of the data base better.

### Beware Repetition

As your topics unfold, watch for repetition and overlap; they creep in. And be careful in expressing opinions or using humor. Your personal views should always be made clear. Humor is different things to different people, and there are few Mark Twains or Ro-

*(Continued on In Depth/4)*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You might say we're now doing for communications controllers what we've already done for tape and disk controllers – applying the latest microprocessor technology and some sexy design to give our customers the performance and reliability they deserve.

Our newest achievement proves the point. To wit: just one hex size board, occupying a single Unibus slot, provides up to 64 lines for terminals, printers or other communications I/O. That's eight times more efficient than the DEC approach.

And our unique system organization means maximum flexibility. You can daisy-chain up to four remote distribution panels, expanding in 8 or 16 line increments all the way to 64 lines. You can configure any 8 line group for an RS-232 interface, with modem control a standard feature. Or you have the option of selecting a current loop interface. And because all your interface variations are made at the distribution panels, no additional hardware or cpu restructuring is needed when you add channels.

You get everything you got from DH-11, such as DMA on transmit operation and line format flexibility. Naturally, we're fully software transparent and run existing DEC diagnostics.

But we like to do everything we do just a little bit better than the other guy. So we boosted performance to 19.2 K baud per line. For peak traffic, we can "double fifo" to 128 characters per 16 lines. Multiple controllers can be added for increased capacity. You get full 16-bit word transfers on DMA operation – not just byte transfers. And, of course, we've taken advantage of our system's high speed bipolar microprocessor to build-in extensive controller and channel self-test and fault indicators.

We're concentrating on DEC, making the world's best cpus even better with some ingenious controllers. We've done it for tape and disk interfacing. Now for communications I/O. We'd like to send you all the details we didn't have room to include here. So write or call Emulex Corporation. Or, if you just can't wait, contact the Emulex representative, dealer or distributor nearest you.

For immediate, off the shelf delivery contact our national distributor: First Computer Corporation; Corporate Square, 825 North Cass Avenue; Westmont, IL 60559; 312/920-1050.

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IN DEPTH

*(Continued from In Depth/3)*

bert Benchleys among us. Sexist remarks and bathroom jokes should be avoided at all cost.

And remember, the hallmark of good writing is revising and rewriting. Don't feel your words are carved in stone, for every time you carefully revise your manuscript, you will improve it. Your original outline will probably change as you progress in the manuscript; this is fine, since certain ideas or procedures will assume more or less importance. And you'll find better, more effective ways to express you ideas, too.

Every good writer rewrites and rewrites. Once, a young writer submitted his first novel to a publisher. After reading it, the editor wrote back that certain aspects were unclear and needed work, but he promised a second reading if the writer was willing to revise. Revise he did, and the editor, pleased with his work, published the book. The author was F. Scott Fitzgerald, and the novel, *This Side of Paradise*, became a smashing success.

In summary, to achieve readability:

- Use concrete words to avoid jargon.
- Make sentences efficient and clear.
- Omit needless words.
- Define terms as soon as you introduce them.
- Strive for coherence in and between paragraphs.
- Create a conversational dialogue with the reader.
- Use the active voice.
- Use illustrative examples.
- Beware of repetition, opinions and humor.

**Interest**

Aside from making learning more enjoyable, reading an interesting book also helps the reader retain more. Why? Because you have shared your own interest and involvement and have made the subject come alive in a personal way, which is transmitted to the reader.

Earlier I mentioned writing about what you know. What you know is not only factual information, but your experience as well, and your experience helps you enliven topics with examples and illustrations. Your experience includes what you have done, what you have seen others do, what you have read and what you have learned and grown to understand as no one else has. From the editorial viewpoint, you must be able to not only *tell* about something, but to *show* as well.

Let's look at two examples of how the concept of data processing is introduced. The first is from *Introduction to Data Processing* by Martin Harris (Wiley):

> However large or small a company may be, or whatever method it uses to process data, it follows the same general steps. This series of steps is called the *data processing cycle*, a systematic method of handling data and producing desired information [Page 1].

Note that the first word, "however," is weak, instilling a sense of qualifying whatever the author is about to say. It is followed by a generalization about how data is processed ("general steps"). The data processing cycle is vaguely defined, so the reader has trouble grasping its meaning and operation.

In the second example, taken from Perry Edwards and Bruce Broadwell's *Data Processing: Computers in Action* (Wadsworth), the authors have preceded the following paragraph with an article entitled "The Curse":

> In the sixty seconds or so that it takes most people to read Art Buchwald's humorous anecdote, a modern computer can:
>
> Calculate and print natural gas and electrical bills for 600 or more customers, or
>
> Make 60,000,000 computations for scientists, or
>
> Sort into alphabetical order 20,000 checks, or
>
> Print a copy of the first 120 pages of *The Bible*.
>
> The computer can work at speeds that humans cannot. The work that people use computers for is known as *data processing* . . . The term *data processing* means the manipulation of data to generate information [Page 7].

This excerpt relates some fascinating

*(Continued on In Depth/6)*

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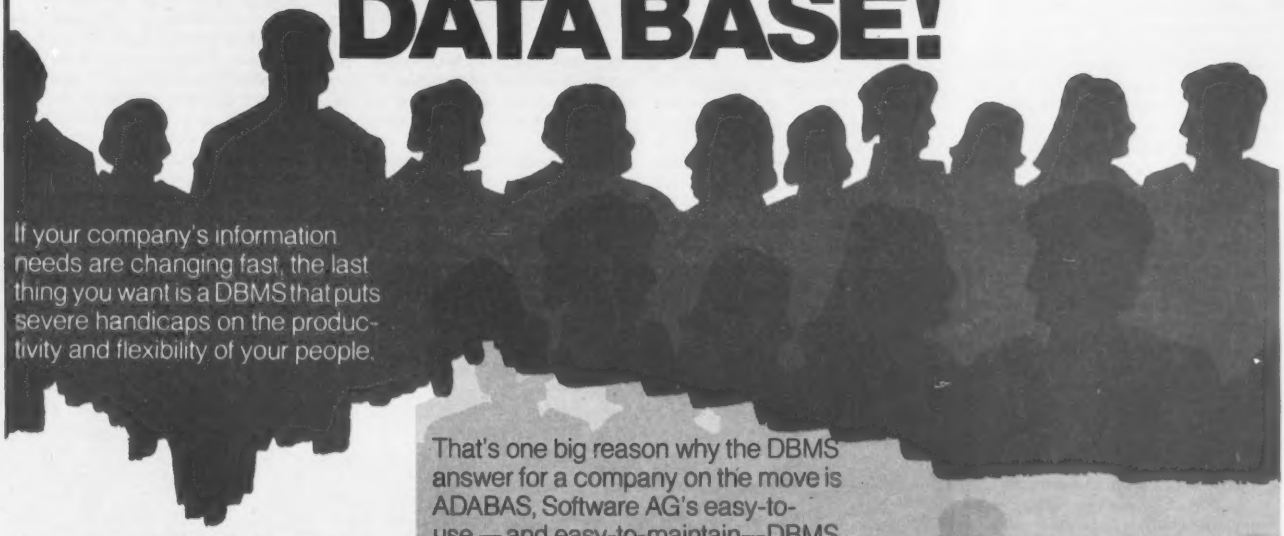

If your company's information needs are changing fast, the last thing you want is a DBMS that puts severe handicaps on the productivity and flexibility of your people.

But, practically speaking, that's just what chain-pointer DBMS systems do. All their logical relationships are hard-wired into the physical data. So, when it comes to meeting the dynamic data access and update requirements of a growing company, these systems simply get too tied up in their own structural limitations to deliver effective, flexible data management.

That's one big reason why the DBMS answer for a company on the move is ADABAS, Software AG's easy-to-use — and easy-to-maintain—DBMS. Our inverted list architecture separates logical relationships from the physical data. This gives you remarkably flexible access to, and control of, the data base.

With ADABAS, you decide exactly what your data base relationships will be — and change them anytime you want, to meet special corporate needs. Without any effect whatever on the data base or on existing programs.

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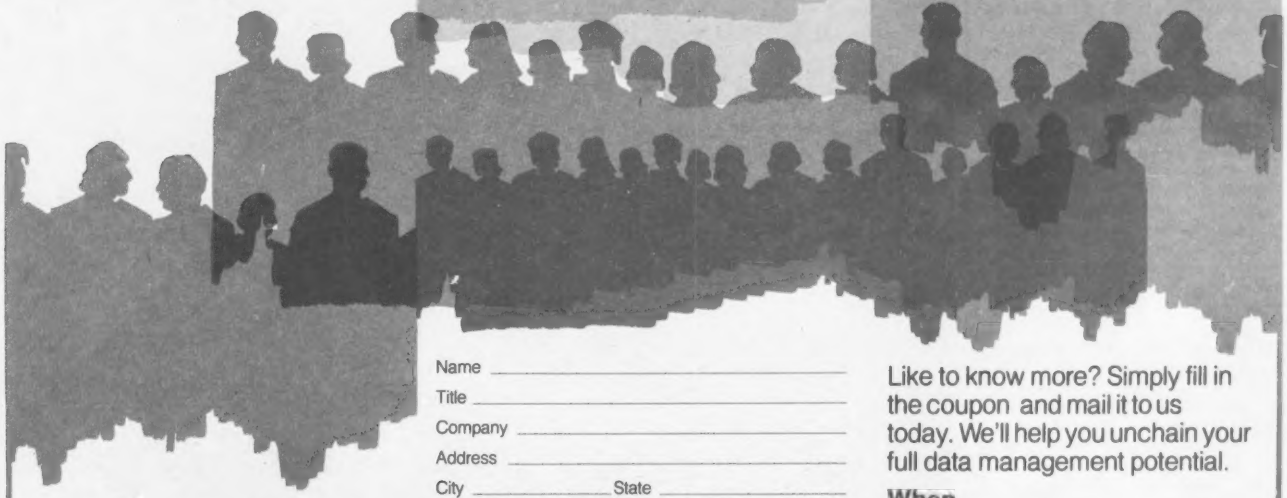

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IN DEPTH

*(Continued from In Depth/4)*

examples of what computers can do, capturing the reader's interest. The authors then explain what *people* do with computers and immediately define the term "data processing." They have shown as well as told. In addition, by using action words such as "sixty seconds" and "work," they have conveyed the essence of how computers operate.

In addition, note in the first example how both sentences are approximately the same length, while sentences in the second example vary in length, tempo and format. Your prose should have a tempo, rising and falling, so sentences are not uniformly dull and seemingly alike. This tempo keeps the reader's interest awake.

In summary, then, to achieve interest:

- Write about what interests you and show why it is interesting.
- Use stories, anecdotes, examples and illustrations whenever possible.
- Involve or describe people and their activities when appropriate.
- Use vivid action words and vary sentence length to keep your reader engaged.

### Making the Publishing Decision

Several factors affect an editor's decision to offer you publishing agreements for your book: its sales potential, your ability to complete the manuscript and how well the two of you can work together. As I have mentioned, first impressions — the professionalism you demonstrate in submitting your proposal — count for a great deal. Yet no matter how good the proposal is, the idea must be sound and marketable.

Let's say, for example, you submitted a proposal for a book on one data dictionary system. The editor may like your analysis and your writing, but feels the topic is too narrow.

The proposal could be rejected, or the editor may suggest you modify your approach to, say, include several data dictionaries. If it is within your experience, it probably makes sense to do this. Equally important, a dialogue and rapport have been established, so both you and the editor can assess the prospects for working together.

Make no mistake, the strength of this relationship can make all the difference in completing a successful book. It is a fertile ground for sharing ideas, being mutally supportive and developing your ideas into a successful book.

Several years ago an author approached me with an idea for a book on business communication. He had some interesting ideas and, combined with his teaching background and prior publishing experiences, he seemed an ideal candidate. Unfortunately, there were a great many business communication books already on the market. I suggested, since he taught at a better university, mostly to management students, that he write a more sophisticated book. He critiqued the two or three books in the area, rewrote his prospectus and outline and resubmitted it. After garnering several favorable reviews, I offered him contracts. We worked well together and have since enjoyed working on several other projects.

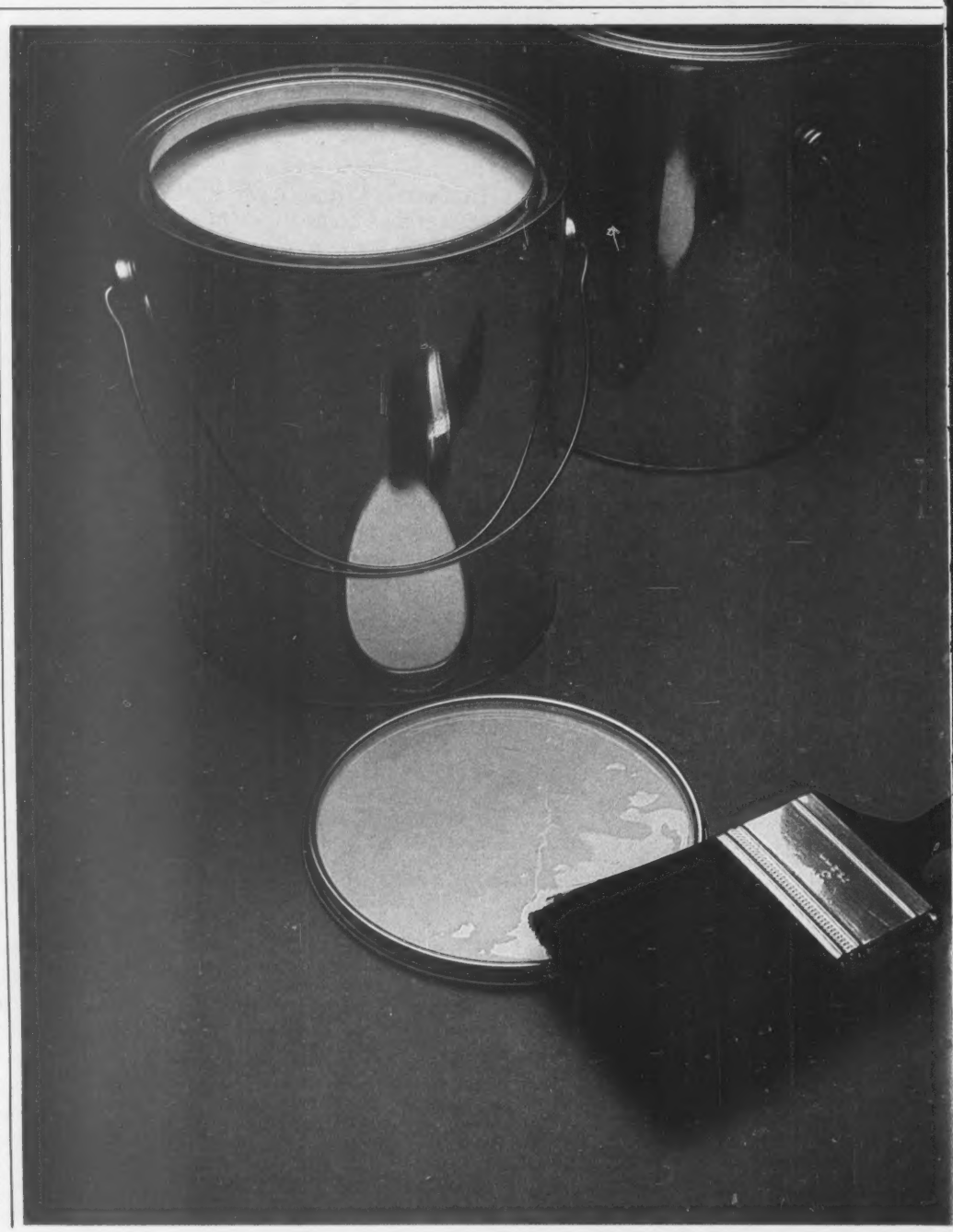
Editors are discriminating about the projects and authors they contract, and you should be equally discriminating in choosing your publisher. Each house has its own personality and manner of conducting business, which should be considered along with the personality, knowledge and expertise of your editor.

Two reference books, usually available at local libraries, list and describe most publishers: *The Literary Market Place* and *Writer's Market*. Both are annually revised and updated. You might look at the books in your own library, to see which you admire and respect.

Discuss publishing experiences with others who have written books. Since your decision will be the product of many factors, it is important to gather as much information as possible.

You should carefully weigh and evaluate such things as the publishing agreement terms, editorial support and guidance, copy editing, design and production schedules, and marketing and advertising programs. In the computer field, key things to look for include:

*Are you being offered a "standard" publishing agreement?* Most are standard and rarely require the talents of an attorney to understand. The agree-



# WRITING YOUR FIRST BOOK

IN DEPTH

ment simply says that if you complete a manuscript on the subject stated, by the completion date, approximately the length described, the firm will publish and market it to the best of its ability. Be certain the company you work for has given you permission to write, and the right to use, whatever concerns your work for them.

*A professional publisher will copy edit and proofread your manuscript.* You should receive quality editorial assistance, including art rendering, design and layout during the production process. Be sure to ask about these services.

*Many aspects of the production process cannot be hurried, but often your book's subject may be time-sensitive.* Some progressive publishers are aware of this and use high-tech equipment or progressive practices to hasten things. Learn what the prospective publisher can do for you and find out what you can do to help move the process along more quickly, too.

*A publisher is no better than the marketing and advertising it does for your book.* Most computer books are sold by direct mail, which means sending out hundreds of thousands of pieces of advertising each year. These include fliers, brochures and catalogs describing your book and others. In addition, the book should be promoted via press releases, advertisements, excerpted portions and book reviews in the magazines and trade journals, by book clubs and other promotional avenues. Some publishers also stock their books in retail book and computer stores. Be sure to ask about marketing, and look at samples of ad campaigns.

### The Manuscript: Mechanical Considerations

Some editors will want you to submit the manuscript in portions, often for review purposes; others, once they are assured the content and writing are acceptable, will ask you to submit the completed manuscript. In either case, following these rules for physical preparation will make both your work and the production editor's go more smoothly.

- **Typing.** Your manuscript should be typewritten, double-spaced, on one side of white bond paper. Any tables, graphs or other illustrations should be on a separate page with no manuscript copy. Footnotes or references should be on a separate page at the end of the chapter. Your editor will probably want the original manuscript, but be sure to retain a file copy.
- **Manuscript preparation.** Your manuscript should be submitted with the following:

*Front matter:* This consists of the title page, copyright page, forward, preface and acknowledgments, and a complete table of contents (and list of illustrations, if required).

*Text:* Each chapter should begin on a new page, and topics should be arranged into headings and subheadings (in much the same way they are in this article). All tabular material should be properly referenced in the text (such as, "In Table 3-1 . . .") and located as close as possible to the illustration. Likewise, all quotations should be numbered and correspondingly referenced in the footnote page at the end of the chapter. Be sure to number each manuscript page consecutively at the top right-hand corner.

*Back matter:* This might include an index, glossary of terms, appendices or a bibliography, depending on the nature of your subject and what you and your editor think is necessary.

- **Permissions.** The Copyright Act of 1976 is intentionally vague on how much you can quote from another published source without having to request permission to quote. This is called *fair use*, and each publisher interprets it differently. Yet it is a serious matter and requires your close attention. The rule of thumb is that anything over 100 words may require permission. Permissions are also required, almost invariably, whenever you reproduce any kind of artwork. Be sure to discuss this with your editor to determine the publisher's policy. Most houses have a standard procedure and/or form letter for obtaining permissions, but remember, you are entirely responsible for identifying and obtaining them.

### Getting Ready for Production

Many naive authors, upon writing the last paragraph, think, "Hooray! I'm finished!" Sorry to say, it's not so.

*(Continued on In Depth/8)*


# HP3000 USERS: FREE PAINT OFFER.

Hewlett-Packard is a computer company that also makes disk drives. If you own an HP computer, say the 3000, you know just how good it is. And if you want drives with the same brand name, right off the shelf, then you know that HP's drives, such as their 7925s, will make a pleasant and color coordinated match. But here's something you may not know: *the best drives to attach to your HP3000 are not made by HP.*

## DON'T COMPROMISE, SPECIALIZE.

We are United Peripherals, a new company founded on the proposition that some folks do certain things better than others—and that few folks do all things better than anyone else, particularly when it comes to computer peripherals. Sure, HP can offer you the same name on the console, and the same color. But when it comes to performance and capacity, when it comes to space savings and cost savings that are so critical today, you should go to the folks who don't think of drives and controllers as "convenience" items, as profitable incidentals. You should go to folks who specialize, who innovate in those areas because their very existence depends on it.

## COMPANIES LIKE CDC, MICROCOMPUTER SYSTEMS, AND UP.

Let's start with us. UP. We put peripheral systems together, utilizing the best components and attaching them to the finest minicomputers. Because we are directly affiliated with Microcomputer Systems Corporation, finding the specialist in disk drive controllers was simple enough. MSC has shipped more controllers than any manufacturer in the industry. As for disk drives, you don't have to look any further for a specialist than CDC, another Number One company. Bringing all of the elements together into a superior system is the job of UP. Our credentials follow.

## THE UP1696. SUPERIOR BY ANY MEASURE, EXCEPT MAYBE COLOR MATCH.

Our UP1696, featuring the powerful 600-mb CDC 9775 and the sophisticated MSC 1696 controller, opens up a whole new world of possibilities for HP3000 users. First, *capacity.* The UP1696 is command set and software transparent to the HP3000. To the computer, it actually looks like four 120-mb HP7925s. So, instead of the maximum capacity of 980 mb possible with HP, you can expand, at your own pace, to 3840 mb with eight of our drives.

Beyond capacity, and largely because of it, the UP1696 opens up a world of savings as well. For instance, *40% savings on disk drive costs,* when you evaluate on the critical dollar-per-megabyte scale. And *up to 75% on floor space,* because the UP1696 features four times the density of HP disk systems. And today particularly, floor space is just another word for dollars.

## MORE RELIABLE, MORE MAINTAINABLE, AND FULLY SUPPORTED.

If there were any advantage in HP3000 users going with HP drives, it would seem to be in the area of service. One name, one place to call in case of problems, right? Well, it's no different with UP. One call to us puts any service problem into one set of very capable hands. Ours. No wrangles. No buck passing.

However, there'll be a lot less service to be concerned about, because the UP1696 is simply *more reliable and more maintainable.* Because the drive is a superior, state-of-the-art product. And the controller, with its low parts count and quality components throughout, means there is less to go wrong. Beyond that, software diagnostics as well as microdiagnostics insure rapid isolation of problems that do occur.

## ABOUT THE FREE PAINT OFFER.

So, okay. If after we've put together a better system to attach to your HP3000, one that delivers more capacity, better overall performance, for less money and in less space, you still want the colors to match, you've got it. We'll send the painter out.

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IN DEPTH

*(Continued from In Depth/7)*

There is quite a bit of work still to do.

Once you have completed the manuscript, your editor may want to obtain final reviews. The reviewers may suggest changes, additions or deletions in topics, coverage, depth or other areas. You will probably have to do some rewriting. In any event, once your editor accepts the final draft, you're ready for the production process. Here's what will happen:

1. **Copy editing.** The copy editor will carefully read the manuscript for clarity, style, organization and level. You will recall we discussed this earlier; the better your writing, the less work — and delay — in copy editing. Spelling, punctuation, grammar and mechanical details (tabular information, footnotes and so forth) are checked, along with your permissions. Once this is done, the manuscript will be returned to you to approve the corrections.

2. **Production editing.** Once you have returned the copy editing, the production editor will type mark the manuscript for the compositor. This involves making funny little marks and numbers, which are instructions to the compositor, labeling headings, type fonts, captions and such. The designer also gets involved at this point, helping choose type faces, determining page layout, art placement (and redrawing, if necessary) and book trim size.

3. **Proofs.** Next you will see *galley proofs*, which is the entire typeset text in long sheets. The compositor has simply sat down at the typesetting machine, not unlike a typewriter, and typed out the entire manuscript on a continuous roll of paper. You must carefully proofread the galleys for errors. You will probably receive proofs for artwork, too. Once you have checked the proofs, the compositor will make the corrections and return the *page proofs*, which are the text pages prepared pretty much as they will look as a book. You will get to read and correct these, too, but by now there should be few errors. While this is occurring, the production editor will prepare the front and back matter (paginating the table of contents and index), placing all the artwork on the correct pages, preparing a cover and registering copyright notices.

4. **The published book.** Once the final proofs are corrected and the entire manuscript is pieced together (called dummying), it is sent to the printer. The printer literally takes a picture of the pages, usually 32 to a shot, and prepares a negative, just as your camera does. This negative is used to photochemically engrave the plates, which go on the press and print the book. The process is called offset lithography.

Each printed page is then folded into a signature, which is like a folio, then trimmed, put together with the other signatures in proper order and bound into the cover. Your work is now a finished book!

### Putting Your Book to Work

Jonathan Swift said, "Books, like men their authors, have no more than one way of coming into the world, but there are more than 10,000 to go out of it and return no more." We have already discussed how your publisher should be promoting your book, but you can promote it as well.

You will receive at least five copies from your editor, which you should autograph and give to your superiors and close associates. You may also want to submit to your editor a list of people who should receive complimentary copies. Make sure your company library obtains a copy. Try to have the book reviewed in the company newsletter, local newspaper or trade press. If you give public speeches, it is always useful to mention your book.

Once people begin purchasing it, you may receive inquiries from readers; be sure to answer.

You might even get a call from another publisher, or your own, asking you to write another book. The ways to profit by this publicity are limited only by your imagination.

Publishing is a great experience, involving a lot of hard work, reserved for the few. I hope you will enjoy it.

---

*Jack B. Rochester has held editorial positions for several major publishers and is responsible for numerous best-sellers. He is currently providing editorial and publishing services to people in the computer industry. He resides in Brockton, Mass.*


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It's done digitally—never converted to analog unless you need to go offsite, and then you can pool your modems to cut down on the total needed. Digital switching means you need fewer computer ports and trunks, and no modems for intra-facility communications . . . with increased user access at significantly lower cost.

The Data Communications feature for the ROLM CBX has all the benefits of data switching plus the same automatic route selection schemes used for voice to help reduce toll costs. New features, such as automatic queuing for busy resources and one-button automatic connection of frequently called numbers—plus a package of management information, test and control features—contribute to enhanced productivity and savings.

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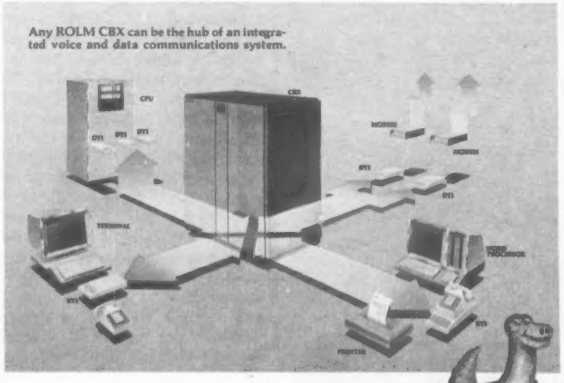

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# The Menace of Micros: A Riposte

BY REX MALIK

Seldom has such specious reasoning, so much mistaken argument been put forward in support of a case as in David F. Stevens' In Depth article, "The Menace of Micros" [CW, Nov. 3].

Now it may be that other readers were not as enraged as I and may have forgotten the outrageous nonsense Stevens purveyed. So let me restate the essential thrust of his argument as fairly as possible before getting down to dismissing it.

The essentials are these. People are lonely. The microcomputer can and will provide companionship. As it grows in capabilities and numbers, it will do so in ever-increasing measure. The major consequence of this will be an end to civilization as we know it.

Stevens wrote: "The microcomputer will enable one to live his entire life without face-to-face contact with another human being.

"But just because complete isolation is possible, why would anyone, or more particularly everyone, want it? Because someone else has it. Because the machine is efficient as a way of delivering individualized services.

"But, most important, because it is safe. To meet people face to face is to risk involvement, and involvement is certain to result in pain. Most people will willingly eschew the possible joys of direct contact in order to escape certain pain."

The core of Stevens' case then, is reduced to the use of two words: "Most," as in "most people," and "certain," as in "certain to result in pain."

Both lead to the obvious question. How does he know what most people will do? What is this certainty built on? Has he gone out and asked people, measuring the response? He has not; if he had, he would tell us so. And if he has not, how can he be certain one way or another? In fact, it turns out that the evidence, what there is of it, is against him.

### Inexorable Process?

The argument is based on the notion that mass-market technologies carry with them the stink of isolation; that there are inexorable processes at work here which lead us in one direction.

Does past experience, however, tend to support him? Have people become more isolated as a result of technological developments, or is there an aura here of viewing the past through nicely individually colored lenses? Is there evidence out there that can be interpreted in that one way, and only in that one way, without ambiguity or fear of contradiction?

Well, for the life of me, I cannot find it. In fact, all the evidence I see leads me to think the reverse. Let me cite some examples.

First, the car. Sure, one sits in a private world, enclosed in this cocoon. But then, most people I observe on both sides of the Atlantic who use mass-transit systems also manage to be enclosed as much as possible in private worlds. And so, in most cases, is the walker.

The point is that the private world is part of the human condition. To assume anything else is to assume that life is like the movies: all highlights with the boring long bits cut out.

But what about CB? The chances are that an ever-growing proportion of the readers of this article will use it. That same mass technology is making it possible for the isolation to be broken almost at will.

People do not have to be isolated. There is choice available, and Western civilization as we know it is, and has been for some hundreds of years, about choice and its provision.

### The Case of TV

Next, we turn to television. The evidence about the effects of television on society is not all in yet, by any means. You cannot even say with surety that Gresham's law is in operation, for on both sides of the Atlantic, a large and growing part of the audience disproves it. It has come to recognize garbage when it sees it and is switching over either to more intelligent programming (witness in the U.S. the rise of PBS) or switching off.

But irrespective of the quality of the medium, does it really promote isolation? Now some of the evidence is contradictory; what weight you attach to it probably says more about your own predilections than it says about television.

One must, for instance, be careful not to generalize on the basis of observing the indolent habits of teenagers. Boredom is about the only firm thing there is — vacuous face, mesmerized by the idiot tube for hours on end. Teen age has long been that way. It was that way before the term "teenager" was created and certainly that way long before television was invented. And it will probably still be so when marketing gets around to inventing television's successor, whether that be a device based on the microprocessor, video or a combination of both. Or maybe something else.

What do critics of television think that people did before it was invented? Do they imagine the mass of the people living the life of a Norman Rockwell cover all the time? Do they really think that the race spent much of its time trying to become engaged in witty conversations?

*It was not like that at all.* And television does not necessarily lead to the converse either. I know that it does not come with the best of academic references, just from observation, but that leads me to another viewpoint on television. It can be a destroyer of isolation, a creator of discussion and argument about matters which are well outside the self, whether singular or group.

### Really the End?

We have one more strand to consider before we can deal with the microprocessor as such — its connection with the collapse of Western civilization as we know it. The idea really sounds as if it came from Monty Python.

Western civilization did not happen by a smooth process of evolution; it did not come about without pain. It has had to absorb the collapse of absolute monarchy, the shocks of the American and French Revolutions, the industrial revolution, the rise of participatory democracy, the end of the slave trade, the rise of the automobile, the movement out of the cities, the rise of the telephone, the television, the computer. The list is by no means exhaustive.

But the point is that at almost any time in the last 400 to 500 years, peo-

*(Continued on In Depth/10)*

IN DEPTH

*(Continued from In Depth/9)*

ple have been able to get up, point to a particular set of developments and prophesy doom and the end of civilization as we know it.

Let us now accept the point of view that the arrival of the microprocessor brings us to one of these points; accept the view that there is something in the notion of the microprocessor that should make us fearful about the future of Western civilization.

But if this is true, what is inherent in the microprocessor? Is it its addictive quality to the minority who now have micros as home artifacts? It would be a mistake to go down this route, I think. The engines that are out on the market now are addictive in large part because they are divisive. A learning and skills-acquiring process is still required. The devices cater to the hobbyist.

And there is a profound truth buried in that innocent last sentence. You see, we have been here before. We have been through it, to pick two examples, with the motor car and with the radio set. Initially both those devices were taken up by hobbyists, and hobbyists were quite prepared to accept that these devices would demand more than the ability to plug in and switch on. Many specialized routines would have to be learned; the devices would have to be mastered and coaxed along.

Civilization is not built out of the preoccupations and obsessions of hobbyists. It allows for them, but they are not allowed to dominate. The aim of the material part of Western civilization has often been to remove the very things that are the attraction to the hobbyist and replace them with the more normal mass-market, plug-in and-switch-on capability. And in doing that, we downgrade them in importance in the scheme of things.

I have not noticed that the general public wants the initial characteristics back. In the main, people are pleased indeed that they have been removed, that the devices have become as deskilled as we can make them.

And why have people voted with their pocketbooks in this way? Because they have better things to do, even if those better things are no more than spending their time with their own obsessive hobbies.

And so I expect that the microprocessor will develop in line with other mass-market technologies and follow the same trends. It will, of course, greatly amplify the capability we have in the home and will lead to substantial changes in habit. And probably many of the most important of those cannot be predicted, as we are talking here of second-order effects.

Thus, that marked shift we have had in the pattern of life, in which substantial parts of the population now live in suburbs, probably would not have come about had the car not made it possible. In addition, television brought entertainment that previous generations would, as a matter of convenience, have had to stay in towns to have had.

### What Uses?

But can we predict what we will use those microprocessors for? In some ways we can. Of course, they will lead to some deskilling, probably more than most people are prepared for. They will no doubt lead us further down the road we are already on. That is, as we deskill a set of processes by putting them up on a computer system, so we in turn move ourselves further up the scale. We extend the educational process to give people more and different skills and reduce even further the time they spend in the active economy. Viewed in this way, the microprocessor is an accelerator.


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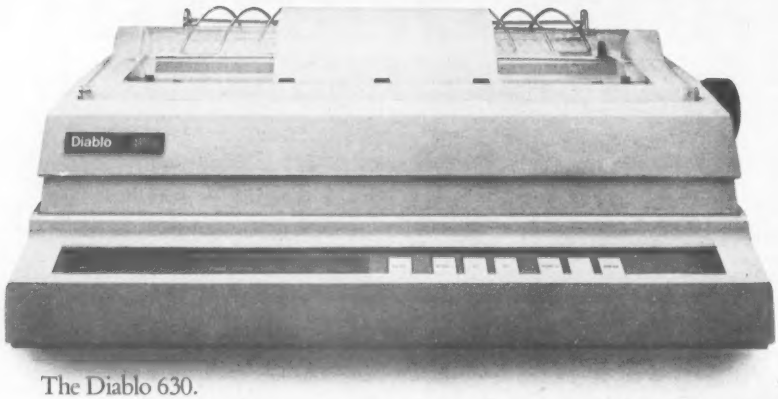


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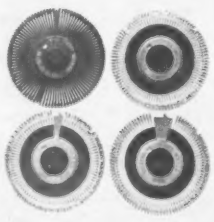

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# MENACE OF MICROS: A RIPOSTE

IN DEPTH

Whether we can take the shock of the microprocessor is a different question, and one perhaps worth asking. But the microprocessor is not simply a stand-alone device; it is also actively being developed as a communications tool. It provides new services and replaces old services dying because of economics and because of an inability to handle the new volumes and complexity at the speed we require.

Thus one can foresee the use of microprocessors as home terminal devices able to handle much of the mail and message traffic. But one also has to ask how many years it will be before the technology is available and widely enough installed for us all to have built national systems. The end of Western civilization, as viewed in Stevens' terms, does depend on that availability.

### Long Way

What are we talking of here in terms of time? One human generation? At least that, probably more, It is noticeable that it is the French who are going fastest and farthest down the route of providing some machine intelligence in the home. No one involved there expects that the first port of call will be an intelligent terminal device for the majority of the population before at least the year 2000.

Most of the experts one speaks to in France put it much further off than that. Yet compared with everyone else, France is moving at the speed of light. So one can say that even if the problem were to be of the kind Stevens supposes, there is still time to take action.

But, and I return to the core of Stevens' argument, what has this got to do with the pain of involvement? Now this connection may be observable in California, the signs may read that way to some people, but I doubt it. In any case, I would hate to draw a map of our future history based on the California experience.

*I expect that the microprocessor will develop in line with other mass-market technologies and follow the same trends. It will, of course, greatly amplify the capability we have in the home and will lead to substantial changes in habit.*

"What California does today the rest of the world does tomorrow" may now be a truism to some people, but I believe the idea to be false.

Fortunately for us, the truth seems to be the reverse. We can, very narrowly, instance this out of the already present "computer culture" (sic). One of the fastest growing characteristics of that culture has been the rise of computing community bulletin boards, collections of data input by the user community which span everything from the most recherche of interests (would you believe the existence of one on home satelite antennae and terminals?) to conventional want ads and junk mail.

*(Continued on In Depth/12)*


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IN DEPTH

*(Continued from In Depth/11)*

And they lead to the associated spinoff: a need to communicate. But what is interesting is that these boards and the embryonic networks they support — and which in turn support them — should have occurred within a technology that is as yet so primitive. People, it seems, do not want out; rather they want in.

It is a tendency of those not involved in the observation of organizations and how they grow and change to assume that most of our organizations have economic purpose. It is a characteristic encouraged, after all, by their managers, who often wish that economics would always come first.

This is, however, only minimally true. The need to organize ourselves into groups and share group experiences is inbuilt. We are dealing here with instincts from our primeval past. It will take more than the microprocessor to change those. What we can say about organizations is that if they did not exist for economic reasons, we would have to create them for others. The breadth of organizations in our societies is immense and growing, and this is so in California, in New York or in the south of England. Indeed, in England I know of one community of 4,000 people which at last count had more than 300 separate noneconomic organizations, and the number is still growing.

*Yes, many people are lonely and will turn to the microcomputer as a device to enable them to ease that loneliness. But it will probably be used as a transducer, a device to enable them to communicate across a wider spectrum than they can now.*

If there is pain out there in human contact, people don't fear it, they actively seek it. They wish to be involved with each other and sometimes go to great trouble to be so.

So in the end, what does it boil down to? Well, yes, that many people are lonely and that they will turn to the microcomputer as a device to enable them to ease that loneliness. But it will probably be used as a transducer, a device to enable them to communiate even more across a wider spectrum than they can now.

### Take Comfort

Can I be certain? Well, as certain as I am of anything in this uncertain world. For, you see, I do not have to wait for the arrival of the microprocessor in large numbers on the mass market place. I take comfort from the way we already use that existing communications device, the telephone.

I have not noticed social contact dropping off as the result of phone usage, have you? In fact, we use it to increase such contact. And so much do we do so, that we often wish it would stop ringing.

In the end, the argument between David Stevens and me comes down to this: We take differing views of how individuals behave and react, though, as I have tried to demonstrate, my view is much more in line with past and analogous experience than his.

I take my stand with Jacob Bronowski, who began *The Ascent of Man* with the words, "Man is a singular animal." If the threat to civilization exists, and I hope that I have shown that it does not, we shall invent our way out of it. We always have.

And Western civilization will continue. We are much stronger, more resilient than that.

---

*Rex Malik is a freelance journalist based in the UK. He writes on a wide variety of computing-related topics.*

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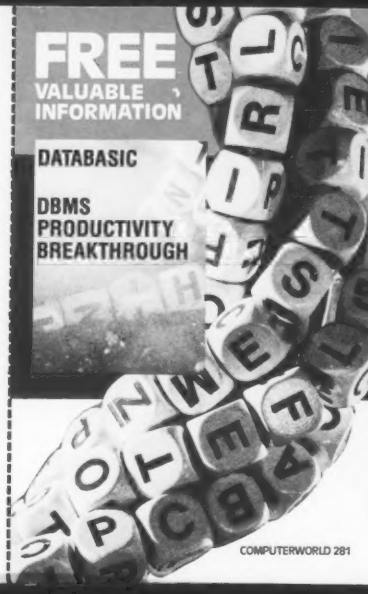


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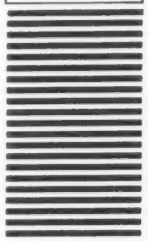

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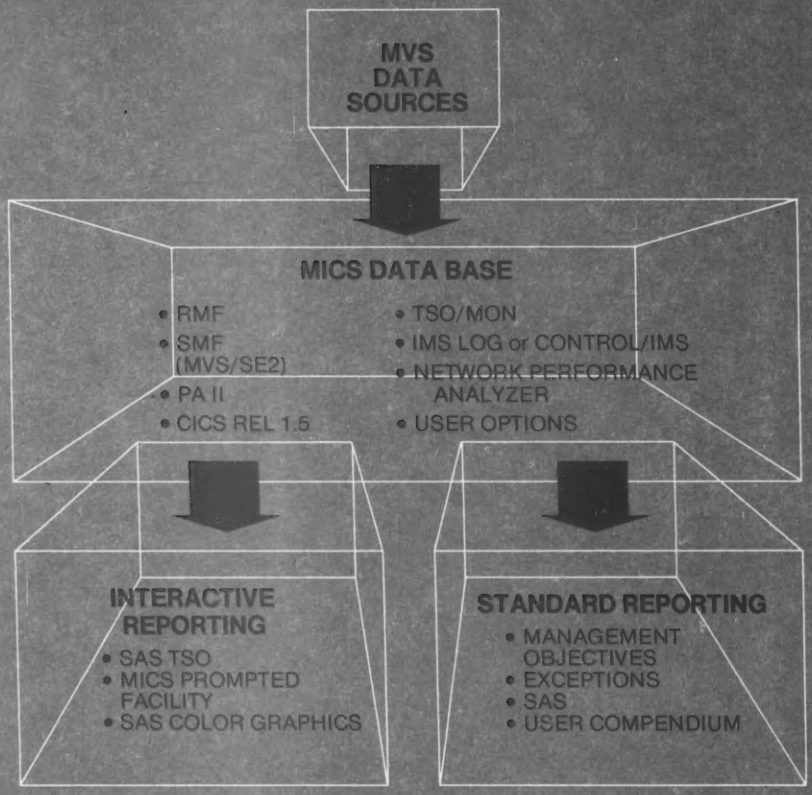


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# Computer Development: Can the Beat Go On?

BY RUDY C. STIEFEL

Digital electronic computers have come a long way in a relatively short time. Compare their rise during the last 30 years with the developments in other fields such as transportation, power or construction. In contrast to them, the computer field has virtually risen from the ideas of a few people to become one of the major industries in the industrialized world.

Now that computers have "arrived," the question is: Will we stay on this level, will we continue to break new ground or are we just at the beginning of a new, steep developmental curve? I would answer that question this way: Yes, we have arrived at a technical plateau where 90% of the basic inventions that make a computer work have been completed, but the general acceptance and usefulness of computers has just begun.

To state it differently, the question no longer is: Can we compute? The main question today is: How efficiently can we solve existing and future problems with economy, reliance, convenience, speed and usefulness of results?

The last few years have belonged to the microcomputer, the famous "chip" a few millimeters square that can perform complete computer functions at useful speeds and with reliability. At the other end of the spectrum, the supercomputers emerged using special cooling or other artificial environments for specific applications that require high speeds and cannot be broken down into parallel operations. Cryogenic devices are in the developmental stages.

A lively argument threading through the industry these days is the issue of centralized vs. decentralized operation. It is an evolutionary process in which both methods will improve. It is hard to recall now that in the '60s it was thought that the only improvement for computers was to make them bigger and faster; many at that time foresaw computer utilities that would be so superior, there would be no point in using a so-called "small computer." They could not have been more wrong! What made small computers feasible were the great advances in integrated circuits, chip developments, automatic testing and particularly reliability, which is the key requirement for most systems. The old claim, "This device is perfect; it will never make a mistake except once in a million," has become useless because in today's computers, such an error rate would produce errors many times a second.

Following are some of the many other salient achievements of the computer industry:

- Time-sharing systems have been perfected, not so much for the purpose of computing, but for sharing common, centralized and standardized information.
- The late 1970s marked the introduction of small computers for word processing, accounting, inventory control and data base management. Standardization of both hardware and software and the efforts to protect them, combined with portability and compatibility, are providing a basis for widespread use of microcomputers.
- Computer-aided design and manufacturing have become viable. Controllers and robots in factories use microcomputers to perform their functions with greater flexibility.

The principle is not new. Items manufactured by the millions, such as screws and nuts, have always been made automatically; but computers enable automatic manufacturing in lots of hundreds. These developments were also helped by the advent of solid-state power relays, but need to be further advanced by convenient nonvolatile memories such as bubble memories, which are not yet in widespread use.

- Increased yield on semiconductor devices is advancing rapidly.
- Real-time and interactive systems have become feasible with today's speeds and memories. However, the decade-long search for a system other than binary has not yielded much, except greater use of the decimal system for the convenience of the operator.
- Computers have taken the small but significant step into the educational field. Hopefully, this will provide better computer education and will better familiarize new generations with the operation and use of computers. Electronic games and other entertainment devices are doing their share to make some of us popular heroes. Some of the heroes complain about the ineffective methods of protecting their contributions in software, but new efforts at enforcing the copyright system for software as well as for the lithography of printed circuits are under way.
- The relatively dull task of standardization is progressing and will probably influence computers in the next 10 years more than any other development. If it is done well, it will accelerate a system's utility. If done poorly, it will impede progress and ensure continuation of inefficient processes. The trend is to implement standard devices such as arithmetic units in hardware and nonstandard devices in software for flexibility. It takes great skill to make the right decisions.
- Hardware is growing cheaper and there is a growing acceptance of the idea that the "best" solution is not necessarily the optimal one. Together with standardization, these trends should help ease the shortage of programmers. We are in a period when the nuts and bolts of computers are being formulated. Just as a machine manufacturer thinks twice before using a nonstandard bolt that appears optimal, the computer industry will have to establish advantageous standards based on readily available, tested and capable devices and programs.
- Last, but not least, computers have made it into the arts. The graphics capabilities of computers have captured the imagination of a segment of the population that not so long ago prided itself on bending, folding and mutilating every punched card that came within reach. Computers have even helped to produce new music that sounds surprisingly good by modern standards of composition.

*"We have arrived at a technical plateau where 90% of the basic inventions that make a computer work have been completed. On the other hand, the general acceptance and usefulness of computers has just begun."*

### What of the Future?

A better marriage between hardware and software? Smaller size and increasing speed? I think very useful goals have already been reached in both areas. Many future developments would still be possible, even if no increases in speed or further reductions in size were made.

Pressure is mounting to increase storage capacity substantially so that new applications will be possible and old ones will be simplified. The video disk may be one way to higher densities. Since video disks are about to be perfected for entertainment purposes, computers also might benefit particularly if read-write capabilities can be incorporated in them.

Standardization of terminals is proceeding, though flat displays to replace CRTs have not made much progress. The much-maligned piece of paper will keep its place as an efficient means of storing "human-readable" information. To put it there, printers, which are really "typers," will improve in speed, quality and size. Matrix and optical (laser) printers will replace "fully formed" character devices, enabling the reproduction of graphics as well as languages without a specific alphabet.

Nonimpact printers will probably gain the upper hand over impact printers because their lack of high inertial forces allows higher speeds. A combination copying/printing device may well become a standard piece of office equipment.

Color is now readily available, but it still evades hard-copy implementation for full use. Simple (that is, inexpensive) color printers are awaited to exploit the color capabilities of computer displays.

### In Praise of Paper

A word in praise of paper may be appropriate here. While I am not discussing the future of the paper industry, computer people should not forget that paper represents one of the most efficient storage media for information. It is human-readable, moderately machine-readable, light in weight and

*(Continued on In Depth/18)*

IN DEPTH

*(Continued from In Depth/17)*

volume, easily portable and reproducible. The much-maligned paper is — and will remain — the most common human interface for a long time to come.

Paper would occupy an even more important position in information storage if it could be used more readily and reliably as an input to a computer. Optical character recognition (OCR) has filled this gap only partially; it requires relatively complex equipment. The ever-more-popular alternative is to provide a machine-readable document simultaneously with the written one, just as the author did in preparing this article.

Improving the "friendliness" of computers, namely the automated processing of "housekeeping" details and "graceful degradation," the forgiveness for human and machine errors, are goals for the immediate future. Other efforts aim at making the computer user independent of various storage means, such as through "virtual storage" systems, and at providing "portability," the ability to run programs on a variety of computers.

The advent and mass appeal of small desktop computers will undoubtedly influence future developments. Everybody is wondering where the main emphasis will fall. At the moment, several sectors are going in various directions: entertainment; personal or home use; small business and professional use; education; and terminals for newspapers and advertising. These systems are often used with television receivers or coupled with TV cable systems.

The medical profession will be one of the major users of computers, as scientists versed in both computers and medicine have finally emerged. The popular CATscanners are a superb example of what this cooperation between medicine and technology can and will produce.

### Computers and Communications

The key connection for the next decade is the relationship between computers and communications. It has been said that information that comes out of computers is rarely useful unless it can be moved. Today, data communications provides that movement. Despite its extensive utilization of computer circuits, it has more basic limitations than computers themselves. The reason is that communications systems work in a basically hostile environment, subject to outside interferences that cannot be as readily controlled as the manufacture of computers.

Major advances are expected in the combination of computers and communications. Store-and-forward transmission is a good example of the combination of both arts. To the common methods of transmission — namely time, space and frequency division — code division will be added: transmission that fills the entire spectrum preceded by a specific code selected by a suitable receiver.

Trends toward more information compression during transmission are developing, but are counteracted by the need to increase reliability through redundancy and to suit the human language which thrives on it.

Electronic newspapers are in the making, and electronic telephone directories will soon be more economical than printed ones — and always up to date. Electronic voting may bring us closer to the long-sought goal of universal democracy.

On the other hand, electronic funds transfer greatly benefits those who want to rob a bank without ever having to enter it! As a matter of fact, electronic crime will have to be dealt with as familiarity with computers becomes more widespread.

There is a trend toward digitizing voice transmission, even though the input and output are obviously analog — not because the transmission is easier, but because the switching is facilitated.

The multitude of wires ranging from telephone systems to control systems in planes is increasingly being replaced by a high-frequency multiplex system. Efforts are even under way to apply this to household wiring.

Computers are naturally vital to the guidance of spacecraft and have the advantage of being very workable in a cryogenic environment. As our use of space increases, this type of computer will probably find its major application there.

Artificial intelligence has become a

# CAN THE BEAT GO ON?

IN DEPTH

fashionable catchword for describing the valiant efforts to make computers think. They can. But is it worth it? The human memory surpasses by many magnitudes any computer in memory capacity, particularly memory of the content-addressable, associative type. Most existing computers must access their memories through addresses and codes in order to obtain any useful efficiency.

We do not yet know the process by which the human brain can quickly recall and associate inputs made years or decades ago. Even though brain surgery is highly advanced and we know that brain impulses either connect or are accompanied by electrical phenomena, how the brain really works is still a much sought-after secret.

This does not mean that memory type and size are the only differences between the two most famous "intelligent" devices, the human brain and the computer. The main effort in the computer field will be not to replace the human brain, but to assist it in tasks at which the computer excels and that appear onerous to the human being — number crunching, repetitious tasks and certain high-speed operations.

On the other hand, decision-making is still very difficult for computers in spite of all the advertisements (and excuses) sometimes made by business and government that their decisions have been arrived at by computer. The human brain excels in decision-making, and that process is also one of the more pleasant tasks in human life. People usually go out of their way — even fight — for the privilege of being able to make decisions.

The motor has done great things to help and often replace the human muscle. But after 150 years of development, do we have walking machines, eating machines or sex machines? Yes, I believe we do, but the natural customs using human facilities are widely preferred.

Future generations will worry little about these considerations and definitions, but will be more concerned with what the computer can do to increase their power and pleasure.

Perhaps the most important, though least visible impact of computers will come in subtle, almost covert intrusions into our everyday life. Telephones, washing machines, automobiles and airplanes are just a few devices that will abound with computer chips.

### Electronic Mail

Electronic mail, a futuristic capability announced 10 years ago, has become the unquestioned way for efficient "written" communication in the future.

The basic problem is that most of these items require wide bandwidths to transmit a lot of information at high speed. Unfortunately, our most widely used network, the telephone system, has a very limited bandwidth. The most lucrative improvement seems to be to piggyback on cable television systems. With bandwidths of typically 6 mc, they offer ample opportunity to transmit data as well as their highly redundant pictures.

In computers and particularly in communications, we are working with one of the most precious commodities mankind has: the electromagnetic spectrum. Unlike many other materials and systems, it is strictly limited, though the demand for its use is growing and it is the basis for most of modern communications. Fortunately, satellite communication has solved two of the toughest problems, long distance and wide bandwidth, with the strange result that it is easier to transmit a high-speed message from New York to Los Angeles than from one building in New York to another! Optical fibers may offer a solution.

### Some Limitations

In spite of all the ballyhoo about the miracle power of computers, they also have limitations. Foremost, computers are restricted to applications involving low energy levels. By definition and practice, information handling is a low-level energy process. Manipulating quantities of low energy content is the source of the computer's great control power. But to effect this power, to be useful, the output of a computer usually has to be amplified by some means from other fields of technology.

The answer to the often-asked question "Why can't computers solve the

*(Continued on In Depth/22)*


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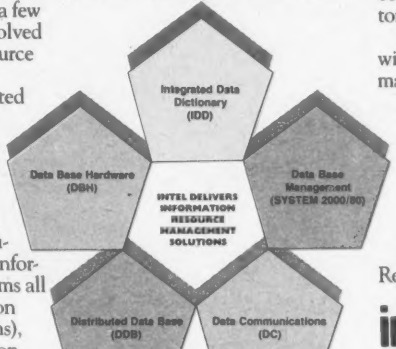
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Data Base Hardware (DBH)
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Data Base Management (SYSTEM 2000/80)
Distributed Data Base (DDB)
Data Communications (DC)

in what form it exists) in your environment. Additionally, the dictionary applies editing, error detection, and correction functions.

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IN DEPTH

*(Continued from In Depth/19)*

energy problem?" is, therefore, limited both in definition and practice. Indirectly, naturally, computers can contribute greatly to making the extraction and consumption of energy more efficient. But as "transformers" of information, namely low-level energy, computers cannot be prime generators of energy.

Surveying the present state of the art, the future and the limitations of the computer field, it appears that the bulk of new developments will be in applications, refinements and improvements — some by several orders of magnitude. Basic inventions are welcome, but not essential for a continued expansion of the industry.

The state of the computer industry can be compared with that of the automobile industry around 1910. Technologically, the basic breakthroughs of portable power generation and its application to a road vehicle has been achieved, even though many refinements, including some regressions to lighter and slower vehicles, were made in the following 70 years. Prerequisites for the rise of the automobile industry were the creation of a suitable road network and the public acceptance that nonprofessionals could and would use the equipment.

The road network applicable to computers is being built now through data communications networks. The operation of computers is starting to shift from the professional operator to the computer user.

Another comparison begs to be made. In the early stages of the automobile, the fastest vehicle was cheered as the best; improvements in speed were literally the milestones of achievement. Early in the maturing cycle, speed became less important; and in the last few decades, it has been substantially reduced from what is technologically feasible. Will the same be true for computers?

A major industry usually develops around a mature technology. There will be plenty of excitement, spirited development and competition in the coming decades. But computers have achieved an adequate maturity to qualify as a major industry.

As in the example of the CAT scanner, the final product is not a computer, but a device enabled or made better by a computer. This is where computers will make their most significant, though least visible, impact. Through incorporation into other devices, big and small computers will, so to speak, enter through the back door into our lives. In many cases, users will not be aware that computer devices are incorporated into a particular process. And the more reliable they are, the less known they will be. The squeaky wheel gets most of the attention.

While we may thus pave our road to obscurity, the way is flanked by many opportunities, exciting challenges and rewards for generations to come.

*Rudy C. Stiefel is founder and president of Infotran, Inc., an engineering consulting firm in New York City.*

*Among his engineering accomplishments are a universal data communications system for the U.S. Signal Corps (with Bell Labs), an electronic voting system and the first electronic mail system proposal to the U.S. Post Office in 1970.*

*Stiefel has been active in the computer and data communications fields since 1948. He held positions with RCA, Sperry Rand and American Arma Bosch before founding Infotran in 1964. He was a member of the IEEE delegations to the Soviet Union and the People's Republic of China. He holds eight patents and has written more than 20 papers.*

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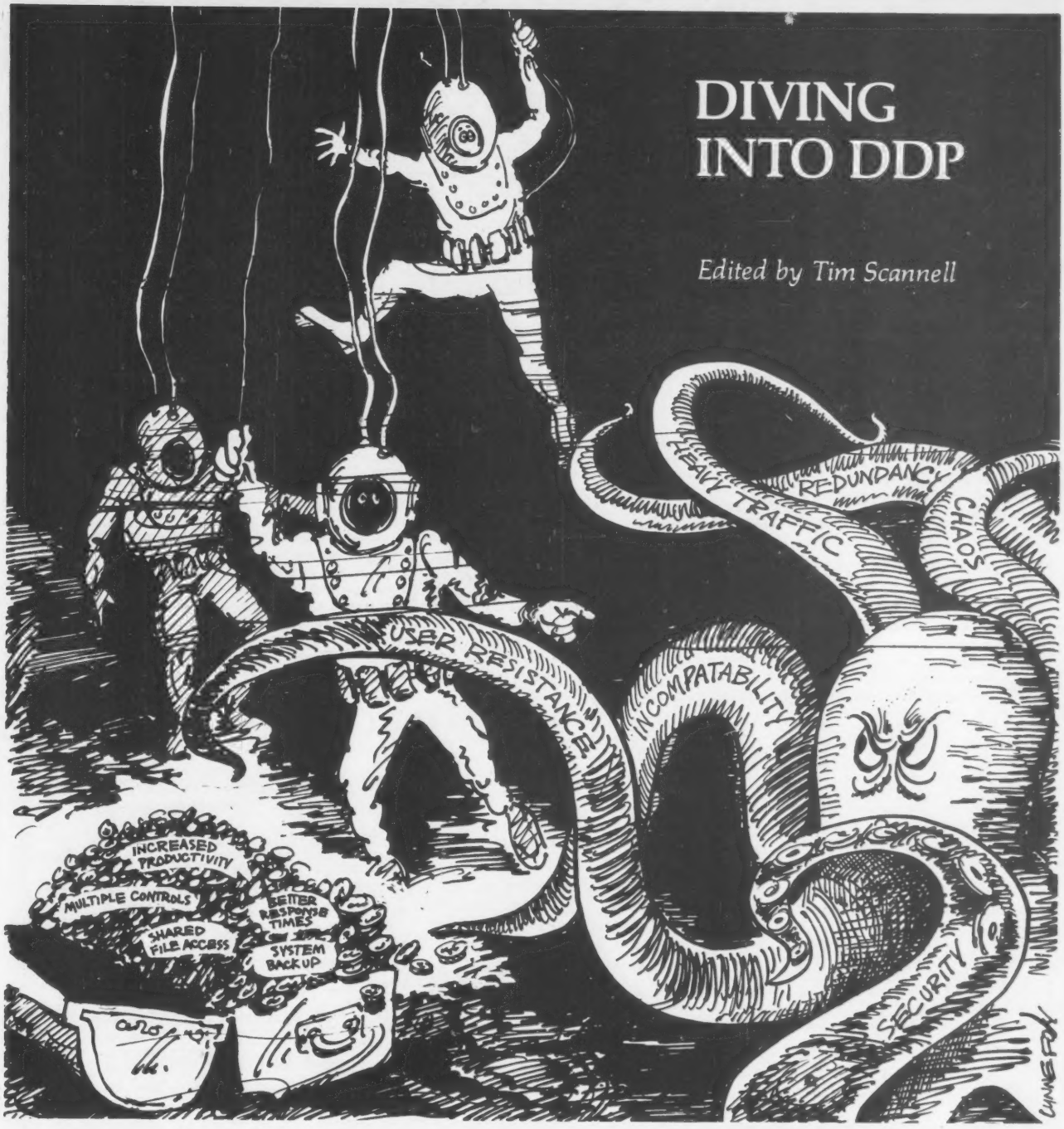
February 23, 1981

SPECIAL REPORT

# DIVING INTO DDP

*Edited by Tim Scannell*




COMPUTERWORLD
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*Problem or Solution?*

# DDP Psyche Holds Clues to Nagging Questions

By John T. Ferrick
Special to CW

Conceptually, distributed data processing (DDP) puts processing in the hands of the end user and off-loads mainframe processing. But there are still some nagging questions: Is DDP a solution, or does it simply reflect the problem? And if it is not a solution, can it cause more problems than it is worth?

To understand exactly where DDP stands, you have to understand how a system works and actually look into the DDP psyche. Basically, you have to realize how the whole process evolved and developed from its data processing roots.

The general migration path of DP crosses through three different phases: batch mode operations in the 1960s, on-line systems in the 1970s and DDP, which is just emerging in this decade.

Local batch work had obvious drawbacks even as operating systems improved and multiprogramming levels rose. On-line work seemed a plausible solution, but then system designers began to see that they really could not put a terminal system out at a remote location and let the user become dependent upon it. All too often the telephone line, central computer or communications controller was out of operation, which resulted in the user being temporarily out of business.

### DDP Solution

DDP was perceived as a way to get around some of the problems associated with a centralized computer. The ultimate users at remote locations many times claimed the central programming staff was not responsive enough to their needs. They added that performance available at the CRT terminals was unacceptable.

There was also a growing, probably justified, fear of overdependence on the central site. The people at remote sites sensed the need for facilities with which they could continue their work even if something happened to the mainframe.

However, as DDP concepts were first discussed and systems tentatively established, technical problems became apparent. The hardware was generally slow. Most of the systems were based on 16-bit architecture, and the work remote users wanted to do generally overburdened this type of hardware.

Differences in programming languages was another major problem. Companies with central IBM-oriented staffs using Cobol/VS found they were often installing systems at remote locations that had vendor X's "fantastic, most incredible, most absolutely outstanding" language. The problem was that only vendor X knew the language.

All too often, each remotely installed system supported only certain communications protocols and mismatches were the order of the day. Processing was distributed all right, but communications with other remote sites or with the central site, assuming there still was one, was very inefficient.

Because of architecture, language and communications differences, a number of systems might be doing the same things but were incompatible. Nothing fit together: programs developed for location A did not fit on location B and none of the remote routines ever fit back at the central site.

Beyond all that, organizations were putting DP equipment in non-DP settings. They put systems in clerical offices, and the equipment suffered in the environment that had no DP-oriented personnel regularly on site. The systems were implemented at the remote sites where support, maintenance, overall operation and control of the system was difficult.

### Ironic Twist

Despite all the problems, however, DDP operations have been installed. Yet even in the really successful ones, there's an ironic twist: a growing dependence on that remote system. Once application programs supported by the DDP system become critical to the remote site, downtime becomes intolerable. And in many instances, no matter how good it seems to be when it is working, the equipment at the remote location is less reliable than the large-scale central computer center with built-in redundancy, emergency power supply and the like.

The original problems of the remote users were solved; they saw the responsiveness and utility of the equipment and pressed for more functions. However, new problems developed because of flaws in the way DDP systems had been put together.

For example, some people setting up DDP operations wanted to put both programming and processing in the hands of the user, reasoning that if you have a billing application, give the billing people both capabilities. If you have an order entry or accounting application, give the users languages that are simple and easy to program.

This approach, however, raises some serious questions about accounting principles. It removes the wall between the people who originate and process the work and those who can and should control the system. It means the person processing checks has the facility to alter the processing system. The people generating bills can alter the billing program.

The designers often were so concerned with giving the remote sites DP equipment and a sense of control over their systems, they forgot the corporation and the responsibility it has to itself and to all the remote locations. Even when it is a collection of semi-autonomous subsidiaries or divisions, the corporation still exists as a single unified and unifying entity. It does not operate in completely disjointed fashion. It has to tie everything together and it is not to the benefit of the corporation to have massive conflicts between the user and the programmer regarding system selection and development.

In addition, the corporation needs a system it can maintain. DP systems are becoming the life blood of the corporation, so their reliability, maintainability and operation becomes essential. In addition, the corporation cannot afford to give up control completely. Installing systems at multiple locations without any facility to control them puts tremendous burdens on the corporation.

Very simply, DDP systems created under the design concepts and technology available in the mid-1970s tended to leave all interested parties — users, programmers and the corporate — unsatisfied and in the position of having to make trade-offs or compromises with their natural interests in the selection of a single system.

To resolve the problems of those primitive DDP operations, designers may just have to go back and rethink the original concepts. They may have to recognize that although "traditional" DDP had to be concerned more with the distribution of the processing, now most of the technology problems have been solved.

### Reliable Links

Both host and remote processor links are more reliable. We have network diagnostic capabilities, digital lines, satellite links and dial back-up facilities. Languages are more standardized and "universally" available than they were (though they still are not tools for everyone).

So now that we can, we must make sure the systems meet the real needs of each of the three groups. The remote user needs a performance-oriented, reliable system. The programmer needs a remote system with the same programming orientation as the central mainframe. In addition, the DP group needs to be able to support the remote system from a central location. Once these needs are met, the corporation also benefits by getting a system which is easy to control and maintain.

Remote systems cannot exist as separate entities. They must be tied together to function as a unified whole. DDP is evolving away from concern about distribution to concern about coordination of processing. When systems are designed and implemented along those lines, they will be sucessful.

*Ferrick is director of Product Marketing for Paradyne Corp. based in Largo, Fla.*

## Inside

**Local Networks Latest Step In DDP Evolution** ..... SR/3
**Splits Over Methods May Draw Battle Lines** ..... SR/5
**Print, Broadcast Firm Ends 'One-Room Nerve Center,' Improves Information Flow** ..... SR/7
**Nontraditional Selection Right For Media General** ..... SR/7
**Vendors Making Hardware Conserve Software** ..... SR/8
**Amusement Park Chain Finds DDP Main Attraction for Flexibility, Control** ..... SR/11
**IBM 1800 Shop Evolves To State-of-the-Art Net** ..... SR/13
**Mini-Based Net Unearths Improved Mine Safety** ..... SR/18
**DDP Spells Relief for Drug Firm's Headaches** ..... SR/21
**DDP Transfers Design Responsibility to User** ..... SR/24
**Effective DDP Demands Simple, Fast Network** ..... SR/27
**System Pieces Together Auto Accident Data** ..... SR/32
**Welfare Saves Money While Giving It Away** ..... SR/35
**Users' Role Expanding In DDP Development** ..... SR/37
**Secure DDP Systems Require At Least Two Lines of On-Line Defense — Functional, Organizational** ..... SR/38

# Local Networks Latest Step in DDP Evolution

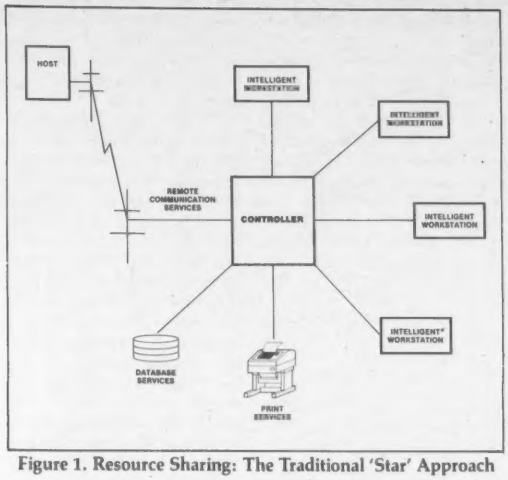


Figure 1. Resource Sharing: The Traditional 'Star' Approach

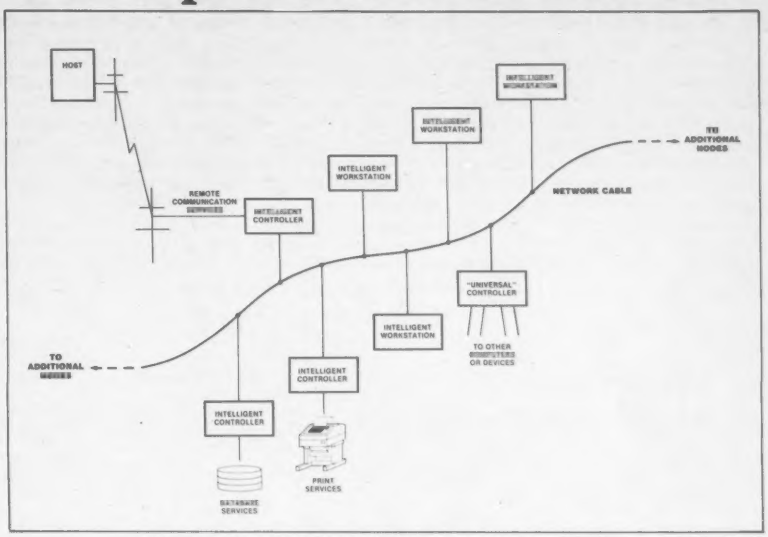


Figure 2. Resource Sharing: The Local Network Approach

By Dale Way
Special to CW

The latest evolutionary step in the development of distributed data processing (DDP) is the local area network. Basically, it builds on what has come before and offers a number of major advantages such as increased flexibility, low-risk modular growth and the ability to interface multivendor equipment.

Since local area networks (LAN) are attracting more and more attention, it might be worthwhile to illustrate the trends that led to this technology's emergence as the most effective means of addressing user problems today.

In the beginning, of course, was the host computer. This machine did all the computing work, and it was located in a large, elaborate, white-gated room where highly trained specialists saw to its needs. These specialists were responsible for the arduous task of getting information into and out of the system.

Soon, devices came along to facilitate the giving and receiving of this information. These devices — chiefly card readers and printers — were constrained to remain physically close to the central host computer.

### Remote Workstations

Next came the advent of remote workstations such as teletypewriter devices and, later, CRT terminals. These could be placed at locations distant from the host — in other buildings or towns — with data being transmitted to and from the host via telephone lines. These devices were "dump": That is, they possessed no computing power or intelligence.

The addition of some computing power to the formerly dumb workstations was the crucial breakthrough in DDP evolution. With some limited processing capability, these devices began to off-load the host, taking some of the computing burden away from the large central processing unit. The pioneers in this first real distribution of processing power initially applied it to intelligent data entry (to handle error-checking and keystroke-saving functions).

For the first time, the processing of incoming data was performed outside the host computer. Because the incoming data could be closer to its source and because the now-intelligent devices could detect errors, the data going to the host was more accurate. With the host relieved of the burden of finding errors, efficiency and cost savings were achieved.

The addition of more intelligence brought about what we know as shared logic systems. This intelligence, still a significant system cost, could now be centralized in a controller which could then control a number of dumb devices — CRTs and printers. Furthermore, these workstations could share a single remote communications line, for even more efficient and cost-effective operation. The addition of still more intelligence to the controller allowed local data bases to be established and maintained.

The benefits of shared logic systems were twofold. First, a significant amount of processing — largely the organization and control of data from the various I/O devices — could be performed by the controller instead of by the host. Second, some degree of immunity to host failure was achieved.

As the cost of the intelligent system elements (microprocessors, peripheral chips and memories) continued to plummet, while their power and functionality increased, the workstations could become intelligent. Thus the concept of shared resources evolved (see Figure 1).

Before, with shared logic, the devices had shared both the processing power and the peripheral resources of the controller. Now they had to share only the resources — the database, printer, remote communications services and local communications control — that were managed by the controller. The processing functions could now be performed by the intelligent workstations themselves. Just as in an earlier phase of the evolutionary process, the intelligent controller had off-loaded the host, so now, in the shared-resource phase, the intelligent workstations were off-loading the controller. This meant that more total load could be placed on the system with less performance degradation apparent to its users.

### One Step Further

The local area network (see Figure 2) takes the shared resource concept one step further. Here a controller is unnecessary because local communications control is fully

*(Continued on SR/4)*

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# Local-Area Nets Offer Bevy of Advantages

*(Continued from SR/3)*
distributed among nodes placed along a high-speed cable network. These nodes may be microcomputer systems performing data processing or work processing functions, or managing any of the shared resources mentioned above — data base, printers or remote communications services.

A number of approaches to the local area network have been put forth. Zilog, Inc.'s Z-Net was introduced in May 1980. At about the same time, Xerox unveiled the specification for a portion of its local network, Ethernet. Both of these approaches use a packet-switched, contention-based (CSMA/CD), baseband network architecture that provides inexpensive, reliable communication between computing elements and other devices in a local geographic area. Each node in the network is connected via a transceiver unit to a standard coaxial cable (TV cable type) which is the network's physical link. Advanced protocol software allows all these hardware elements to work together as a unified network.

What is important about this architecture is the many benefits it offers over the star — or central controller — configuration.

First, the local area network offers a higher degree of reliability than ever before. If a controller went down, all the devices controlled by it became useless (in the shared logic case) or could not communicate with each other, the data base or the outside world (in the shared resource case). In the local network, the network itself is independent of the status of any of its nodes. So a failure at any one node has no effect on the rest of the system.

The local area network also offers much more room for growth — in both users and resources. With the star, the controller has only a limited number of ports to which devices can be connected. After this number is exhausted, another controller must be purchased. The local area net can add nodes almost indefinitely (more than 200 with Z-Net) for modular growth. If the user finds he has underestimated his growth needs, he can add nodes almost limitlessly without risking obsolescence in any part of the system — a particular advantage to smaller but growing business users.

The same principle applies to resources. While the controller in a star configuration has clearly defined limits to the resources it can handle, local area network can add shared resources just as it adds user nodes. Additional data bases, printer services and more and different remote communications links can be added to the network at any time.

### More Flexibility

A local area network also surpasses the star in flexibility. In the star configuration, controller-to-workstation communication is generally defined by the manufacturer and limited to the use of that manufacturer's devices. The nodes in local area net can be programmed to link any foreign device into the system — specialized I/O devices, word processing equipment, even other computers (micros, minis or mainframes). In this context, the network node can serve as a universal controller, the entry point in a variety of multifunction applications never before economically or functionally feasible.

A lesser but not trivial point is the local network's case of installation. With its extendable cable links, the network can deploy its nodes whenever and wherever needed — at various desks, offices, floors, even in neighboring buildings. The star configuration, on the other hand, requires multiple cables radiating in and out from the centrally located controller.

Finally, because of its inherent simplicity of growth, local area network management does not require a large technical and planning staff. The decision to add another user to the network is a relatively minor one which is inexpensive and easy to implement.

*Way is product marketing manager for Zilog in Cupertino, Calif.*

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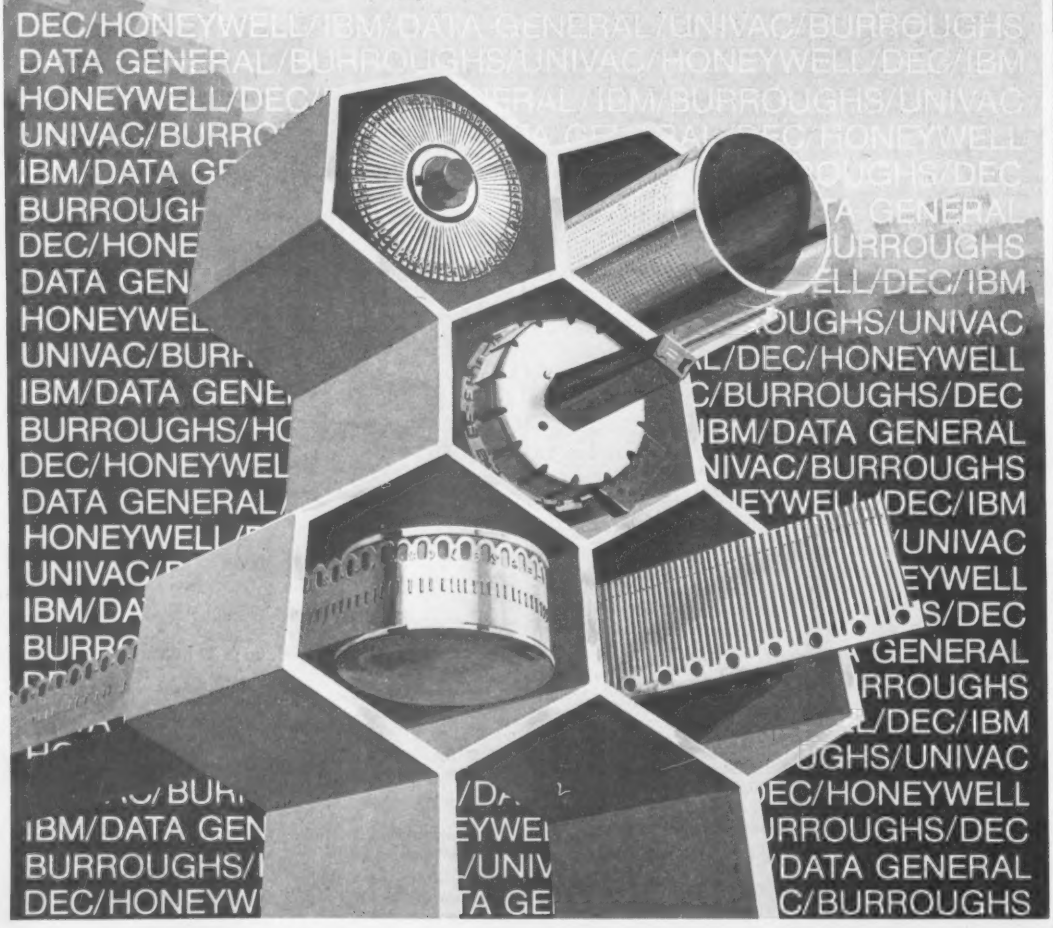

*Centralized vs. Decentralized*

# Splits Over Methods May Draw Battle Lines

By Rita Shoor
CW Staff

BOSTON — The perceived differences between centralized and decentralized processing can split the proponents of either methodology into "two armed camps," Thomas Johnson, director of research at Nolan, Norton & Co. (NNC), noted.

The world of centralized processing is based on tight control within the DP department, economies of scale, systems integration and a highly trained specialized DP staff, he said. In apparent contrast, decentralized processing premises include user-oriented control, better and faster response to user requests, low-cost computers and economies associated with specialization.

*'Rather than persisting with the "armed camp" idea, DP managers should realize that they have, in reality, a whole world of alternatives from which to choose.'*

Rather than persisting with the "armed-camp" idea, DP managers should realize that they have, in reality, a whole world of alternatives from which to choose, Johnson told attendees at a recent NNC-sponsored conference on distributed data processing (DDP) concepts here.

However, this same "world of alternatives" means that every DP manager is forced to cope with change. These managers "are facing broader challenges than they ever faced before" because of the range of choices available to them, he said.

Systems are increasingly complex and new application areas are emerging, he noted. And at the same time that the DP role within the organization is changing, end users are taking on a new role.

*'The time is coming when "virtually all systems will be distributed in one way or another." Central DP people should play an important part in the distribution process.'*

In order to successfully handle distributed systems in such a fluid environment, James C. Emery, another speaker at the conference, recommended the following guidelines for the man in charge: develop a master plan that is as all-encompassing as possible, choose the components to be distributed and maintain tight control whenever feasible.

### Four Variations

He provided examples of four variations in distributed system design. The lowest or most basic form involves distributed processing without local data bases. Typical applications for this low-level DDP are data entry or remote job entry (RJE) systems, he said.

The next step might be a hierarchical system with nonshared local data bases. Highly specialized applications involving computer-aided design with high-resolution graphics or financial modeling systems are examples of this type of distributed system, according to Emery.

Local processors with a distributed data base illustrate the next step. However, he maintained that this type of configuration is "by and large technologically beyond the current state of the art" when extremely complex systems are involved. This design works if there is a relatively low probability of having to access the remote data base. If this is not the case, a central data base is likely to be more efficient, Emery maintained.

Finally, there are fully distributed networks that are composed of multiple autonomous processors without any single computer playing a central role. These are peer-processor systems that are controlled through a market mechanism with the prices of the services providing the primary means of allocating resources and regulating supply and demand. Regardless of the distribution level, Emery predicted that the time is coming when "virtually all systems will be distributed in one way or another." Central DP people should play an important part in the distribution process, he warned. "If not, they'll be in trouble."

*'The best strategy for central DP management is to identify those applications which best lend themselves to distributed processing and advocate DDP for those systems.'*

The best strategy for central DP management is to identify those applications which best lend themselves to distributed processing and advocate DDP for those systems, Emery said. "This provides the DP manager with some credibility when he "says 'no' to distributing other applications."

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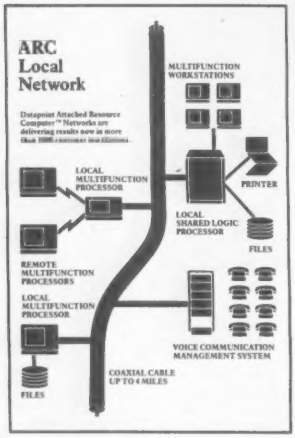


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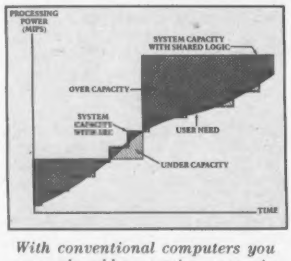


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# Print, Broadcast Firm Ends 'One-Room Nerve Center,' Improves Information Flow

Special to CW

RICHMOND, Va. — Greater individual participation, more computer applications and locations and an end to a limited "one-room nerve center" type of processing operation.

These three things are what decentralization means to a leading print and broadcast company based here that recently replaced its centralized mainframe system with decentralized small business computers. The scattered computers have not only dramatically reduced paperwork and increased efficiency, but have improved the information flow, according to W.L. Waleski, director of information services for Media General, Inc.

In fact, "we expect the $3 million system to pay for itself within three years," he observed.

Media General owns and operates six daily and three Sunday newspapers in the Sunbelt portion of the U.S. and recently purchased a chain of 17 newspapers in Southern California. The firm also owns television and radio stations and cable television networks, as well as commercial printing and typesetting companies, a financial services company and a media magazine publishing company. The communications firm also owns a paper company based in New Jersey that accounts for 15% of all the newsprint produced in the U.S.

### System Setup

The Media General system consists of 10 Hewlett-Packard Co. HP3000 computers, each with 1M byte of main memory and with from five to 50 HP 2645 CRT terminals. Each system also has four 120M-byte disk drives, one tape drive and a 600 line/min printer. Two of the computers are located at each of the firm's three newspaper offices, one each at the newsprint mills in Garfield, N.J., and in Pomona, Calif., and two at the company's headquarters.

The application software for the scattered system was developed by Media General's own computer staff, Waleski noted.

Originally, the company's IBM 370/135 and 360/65 mainframes tracked everything from billing to inventory. But "the very idea of a company of our size and diversification having to rely 100% upon a one-room 'nerve center' was not a positive one with us," Waleski said. "It made more sense for each of the companies and mills to have its own system."

While the HP computer system now does the bulk of the processing work at Media General, the 2M-byte pair of IBM processors is still used and located at the firm's headquarters.

The communications firm initially examined equipment from 17 vendors. The list was then narrowed to three using a rating system developed in-house by the company's computer staff.

An in-depth, quantified study of the top three candidates led to the selection of the HP 3000 Series III computers.

"In the area of hardware, we looked at types of components, maintenance and capacities," Waleski stated. "In program and software development, we examined programming languages, data base support systems, debugging techniques and operating systems.

"Our third area of study was how the system would run overall: how well the entire system would work together, how long it would run without failure, stability in general and the kinds of problems we might have to confront."

According to Waleski, the transition to the HP equipment went very

*(Continued on SR/8)*

## *Nontraditional Selection Right for Media General*

RICHMOND, Va. — The selection process Media General, Inc. used to pick their new computer may not be an industry-wide standard, but it was right for them.

Basically, the company broke their needs into three categories — hardware, software and system features — and rated each vendor on these categories on a scale from one to 10. The firm considered about 17 different vendors and the whole process took about four months, according to W.L. Waleski, the company's director of information services.

Each specific category in Media General's selection system was further divided by subcategories.

For instance, hardware included the type of components and circuitry, capacity and peripheral add-on capabilities; software listed any communications packages and data base management systems; and system features included the average processor uptime, Waleski said.

When all the categories were scored and the final rating compared, the system with the highest final rating was deemed the winner. In this case, Hewlett-Packard Co. came out on top.

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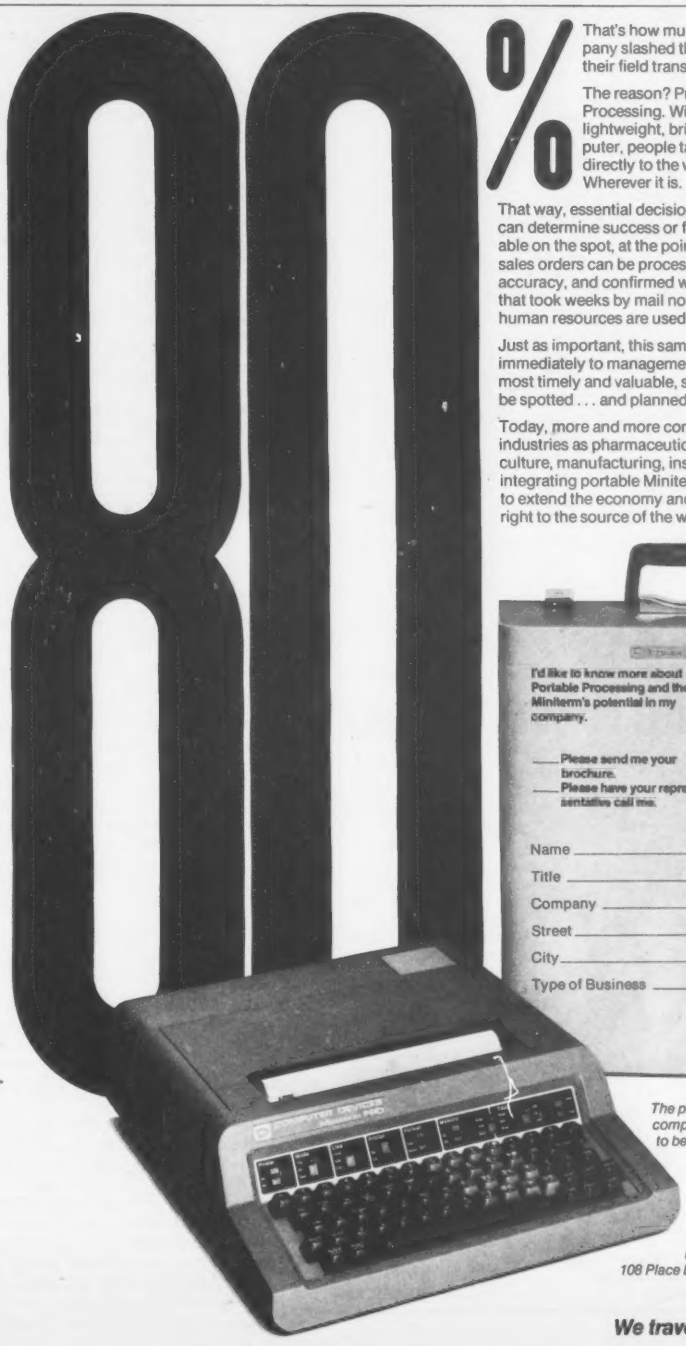

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*DDP Trends for the '80s*

# Vendors Making Hardware Conserve Software

By Vaughn G. Hysinger
Special to CW

The DP industry has shown exceptionally strong growth in the past decade, and this growth is expected to continue throughout the 1980s, unchecked by recession, technological stagnation or market saturation. The growth of the distributed data processing (DDP) submarket has been even more spectacular and shows the same promise for future expansion.

The decade of the 1960s was a period of decentralized processing. Large companies scattered general-purpose computers throughout their organizations, but there was little implementation of centralized control or communications networking. Efficient sharing of information was not yet possible, and there was considerable duplication of resources and expenses.

The decade of the 1970s produced a trend toward centralized processing in which companies established large central computing facilities with access through terminals in remote locations. This approach was made possible by rapid advances in data communictions technology and the steadily dropping cost of communications channels. The trend was initiated and reinforced by IBM's domination of the mainframe computer segment. IBM was able to install large numbers of powerful 370 central processors with access available to remote terminal clusters of limited power and versatility.

### IBM Terminal Clusters

In the early 1970s, other vendors recognized the weakness of IBM's terminal clusters and foresaw the tremendous potential for distribution of the mainframe's power to sites where data was actually generated and used. IBM terminal clusters were replaced with powerful distributed processors offering multifunction capabilities such as data entry, data base inquiry, word processing and program development. Thus distributed processing was born.

End-user acceptance of distributed processing was and continues to be highly favorable. Implementation of the distributed concept has proven to be a very efficient way to spread mainframe power to field offices while retaining central control of the data base.

*'The U.S. government spends approximately $6 billion annually on software development, and the GAO estimates that by 1985, software will account for 90% of federal DP costs. Large corporations with mainframe computers and distributed processing systems cannot afford to take this problem lightly.'*

As distributed processing grew in stature, IBM reacted to the attrition of its marketplace and the devaluation of its concept of highly centralized networks by embracing distributed processing and introducing products such as the 8100 and 4300 lines. These processors are designed primarily for batch applications, but are capable of limited interactive functions for distributed processing requirements.

The decade of the 1980s promises to be oriented around refinement of the distributed processing approach, with a growth rate considerably in excess of the DP industry in general. Estimates of distributed submarkets show dollar volume divided into 40% data entry, 10% data base inquiry, 20% word processing/electronic mail (or office automation) and 30% distributed batch processing. Why the new emphasis on distributed batch processing? The answer lies in software development.

Technological innovations have enabled computer hardware to be manufactured at lower and lower costs, and as volume has risen, costs have dropped further. Unfortunately, as the demand for hardware increases, so does the demand for software, which has not benefited from the same advances in technology. The fact is, software must be laboriously written, tested and rewritten until nearly perfect. It takes long hours to create new programs, yet 80% of most programmers' time is consumed by maintenance of existing software. If you add in the critical shortage of programmers (estimated to be 50,000 below demand in 1980, growing to 500,000 short by 1990), the result is increased software costs.

The problem is getting worse and will continue to do so before it gets better. The U.S. government spends approximately $6 billion annually on software development, and the GAO estimates that by 1985, software will account for 90% of federal DP costs. Large corporations with mainframe computers and distributed processing systems across the country cannot afford to take this problem lightly. International Data Corp. estimates that mainframe users will spend $8.4 billion on software in 1981 alone.

The software problem, combined with the present economic downturn (which results in high-level capital spending deferrals), has provoked vendors to seek ways to conserve existing software. In the case of IBM-compatible systems, if an organization is able to extend the uses of existing IBM software, which is estimated to total between $200 and $300 billion in value, then the available programmers can be effectively employed for important projects.

### Solving the Problem

The software problem has burgeoned to the extent that awareness has increased outside the DP industry. A recent *Business Week* article pointed to the issue as a major threat to American technological superiority. To address the issue, some companies are working on encoding operating systems on chips. Others are attempting to refine development systems to streamline coding and debugging operations.

IBM's 4300 series has been well received as the IBM processor with the best price/performance ratio, but its acceptance is more likely based on its ability to run 370 software: operating systems, program products and, of greatest importance, previously developed applications. This characteristic drastically reduces the need for more programmers, thereby reducing overall costs for computer installations. Obviously this is a desirable goal.

*(Continued on SR/10)*

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# Firm Closes 'Nerve Center'

*(Continued from SR/7)*

smoothly. "We found we were able to do some of the programming work a bit faster than we had expected from our previous experience, because of the system's interactive facilities. We are now able to write and debug programs in half the time it formerly took."

Two areas that have particularly benefited by the move from centralized to a decentralized computer system are the newspapers' classified advertising and circulation departments.

Before the HP 3000s were installed, classified advisers at each newspaper would take ads by telephone, typing them onto a special form. These forms were then punched onto paper, typed by a separate crew, typeset and laid out according to classification and in alphabetical order. Carry-over ads were manually tracked and reset each day. A copy of every ad form was made and sent to the billing department at the end of each shift.

With the new system, each classified ad operation can be performed much faster and with greater reliability. This is especially important to a newspaper organization taking some 1,000 classified ads daily.

The adviser still takes the phone calls, but now can key the information immediately into one of the HP 2645 CRT terminals, where it appears on the screen in much the same format as the old hand-typed form. The system's data base contains text information, customer information for billing purposes and production and scheduling information. The computer automatically calculates the cost of the ad and displays it on the screen.

In the circulation department, operators at the HP 2645 terminals can quickly respond to requests regarding new subscriptions, cancellations, vacation stoppages and missed deliveries.

The system data base in the circulation department contains a wide variety of information on the community and its residents: records of subscribers and carriers, listings of streets and occupied dwelling units and demographic data. The number of subscribers per city is approximately 150,000.

The volume of paperwork needed to keep track of all this information has been dramatically decreased by the computer system, Waleski said. Proper notifications go immediately to carriers and bookkeeping alike. Billing is generated in its final form for mailing to subscribers, and recordkeeping has been streamlined.

The computer system in both classified and circulation departments also reportedly has enabled a reduction in payroll and an increase in profits as a result of the decreased expense. "Some revenue increases can also be attributed to the system since response to both advertisers and readers is noticeably more efficient and fast," Waleski noted.

Employees in both departments have direct access to the terminals and to the data base. The company uses HP's Image/Query data base management system, which allows users more time to collect and analyze meaningful data, while devoting less time to the problem of how to store and access it.

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Naturally, Pillsbury has more than cost accounting in mind for its Level 6 computers.

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In the near future, Pillsbury intends to institute automated office procedures, word processing, and electronic mail.

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# Software Not Keeping Up With DDP Advances

*(Continued from SR/8)*

However, IBM computers are designed primarily for batch processing use, with loop architecture (IBM 8100) and I/O constraints to handle the various types of terminals supplied by IBM. This architecture lacks the flexibility required for CRT-based distributed processing applications.

Of all the potential alternatives for solving the problem, the one with the most promising future is the combination of CRT-oriented window-into-memory architecture found in the distributed processors of Four Phase Systems Inc. interactive systems, connected to an IBM software- and media-compatible back-end type of batch processor.

This combination provides users with a proven front-end system designed specifically for interactive multifunctions and a batch processor capable of handling a full range of IBM software. Benefits include offloading the mainframe to free it for other uses; increased local access to portions of the data base while retaining central control of the whole; the ability to perform extensive number-crunching or program simulation operations in remote locations; the ability to use existing IBM systems control programs, program products, installed user programs and field-developed programs; and reduced telephone costs normally incurred during on-line operations.

For sophisticated end users of distributed processing systems, the Four Phase combination means they can run the full repertoire of IBM software while maintaining complete knowledge of that software through the existing staff. No longer will they be required to access the mainframe computer over expensive telephone lines on a continuous basis. The batch processor can hold those portions of the data base that are relevant to the particular branch office for local channel inquiry or remote inquiry.

It is possible to offload program development functions from the mainframe onto a programmable work station at the local site, for example, to test-compile the program or run 3270 simulation in the distributed batch processor without bothering the mainframe. With a typical Cobol program, the attached processor can do the job with existing IBM software, without using machine cycles at the front-end.

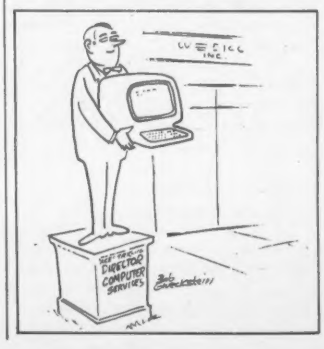
Another example of the flexibility of the interactive/batch combination is when the interactive user executes a data base inquiry. Normally he must access the mainframe through the front-end channel, tying up the channel. With the attached processor, data base inquiry can take place while the terminal executes data entry or word processing, and when the attached processor completes its task, it notifies the user and returns the information to the terminal. This method does not tie up the front end because the attached processor does the search, and it does not tie up the mainframe because the attached processor contains the relevant portion of the data base.

### Development Continues

Today's mainframe computers are large and expensive, capable of power and capacity that seemed unreal a few short years ago. However, if many demands are made on the computers, response time can be severely degraded. Mainframes are too essential to allow this to happen. Distributed batch processing, combined with powerful interactive systems, prevents mainframe overload and provides immediate results at close proximity. Data transfer between the batch processor and the host mainframe can be coupled "loosely" through communications lines or "tightly" through a channel, depending on requirements of speed and convenience.

Distributed processors will be instrumental in the convergence of DP and word processing and may provide the link that creates the automated office. The concept can facilitate electronic mail or any operation that takes advantage of offloading the mainframe. It is evident that tightly coupled back-end systems will significantly enhance the effectiveness of distributed processing systems, leading to cohesive networks capable of accomplishing an amazing, almost infinite, number of jobs. Concepts like the combination of interactive and batch systems are indicative of the creative thinking required to solve complex problems. The distributed processing industry is leading the way through the software bottleneck by adapting and developing hardware into new systems that create an amazing synergism which is only now being explored.

*Hysinger is director of software marketing for Four Phase Systems, Inc.*





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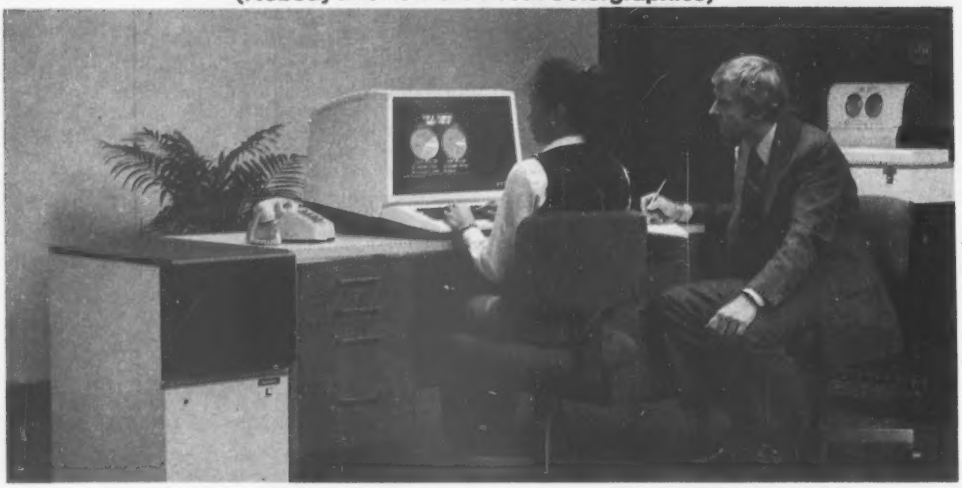

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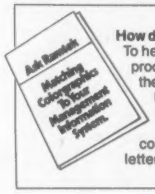


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# Amusement Park Chain Finds DDP Main Attraction For Flexibility, Control

LOS ANGELES — When a $175 million amusement park chain tries to conduct financial, operations and sales functions without the benefit of an in-house data processing facility, the results can resemble a juggling act.

That was the frustrating situation in which Six Flags Corp. found itself in 1978. "Prior to 1978, the corporation didn't have any data processing capability," Tom Dolan, director of management information systems, confirmed.

"Our parks were in different stages of maturity. Some were doing a full range of data processing activity and others were essentially carrying out only payroll and general ledger. Each park used either 'Ma and Pa'-type installations or large national service bureaus," Dolan continued.

What was wrong with this approach? "We simply didn't have an accurate handle on what we were spending on data processing because each park tended to book these expenses differently. And there were no common accounting policies or procedures established," he responded.

The firm concluded that the most viable approach was to go in-house, in contrast to employing a large or unified service bureau. "The most economical and efficient way to accomplish our objectives was to aim at a distributed mode of operation with a primary data center housing a mainframe, and smaller minicomputers or microprocessors located in the parks. With this tack, we'd achieve both local flexibility and improved overall control," Dolan said.

### Three Phases

From July 1 through November 1978, Dolan dedicated the bulk of his time to developing a Six Flags DP strategy. "The essence of our plan was to bring the function in-house in three phases, from some form of batch, to remote job entry, to true distributed data processing," Dolan explained.

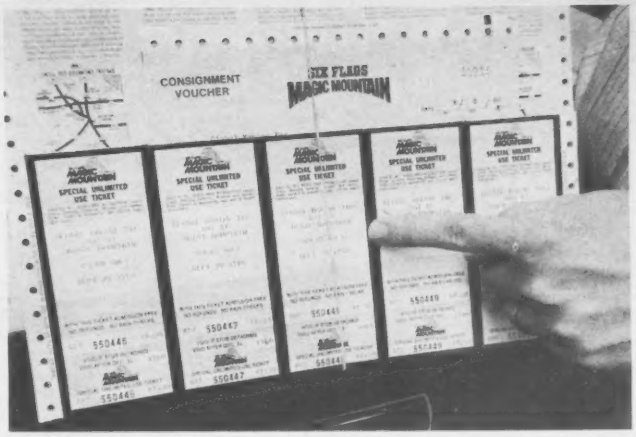
The firm conducted a survey of available equipment, with data entry as the primary function it wanted to accomplish initially. In particular, the company needed the capability of intelligent data entry where it could edit data and validate its correctness. It also required a device with relatively powerful communications capability. Rapid delivery, ease of conversion and price/performance were also factors of consideration.

The final choice was seven Northern Telecom, Inc. (NTI), formerly Northern Telecom Systems Corp., Model 445 systems. The company's six theme parks across the U.S. each house one system, while the seventh 445, used for development, is installed at the Dallas/Fort Worth Corporate Data Center. Three Model 434 systems are on order for installation at the company's two wax museums and corporate offices, as well.

Each NTI 445 is configured with bisynch telecommunications capability, 64K characters of memory (currently being upgraded to 192K), 10M characters of disk storage; a 300 line/min printer and four data stations. Four systems are also equipped with 800 bit/in. magnetic tape drives. An IBM 370/145 — located at the Data Center — communicates with each 445 through a Memorex Corp. 1270 transmission control unit, forming the hub of a wheel-shaped network.

What prompted the hardware choice? "There were several things with which we were particularly impressed — the most notable attraction was the price/-performance ratio of this equipment.

*(Continued on SR/14)*

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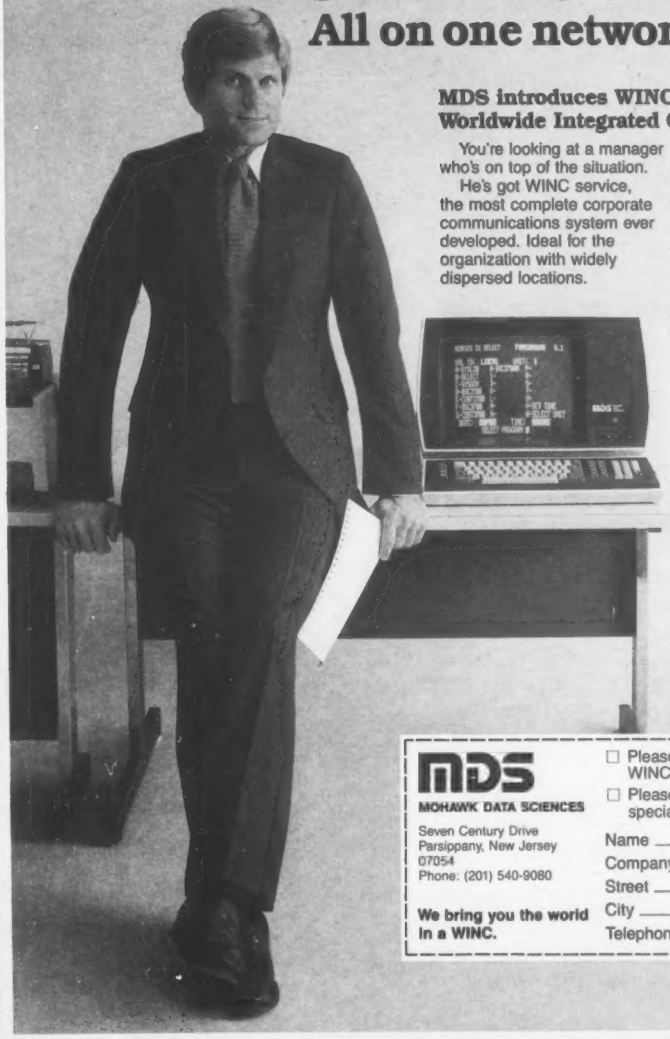

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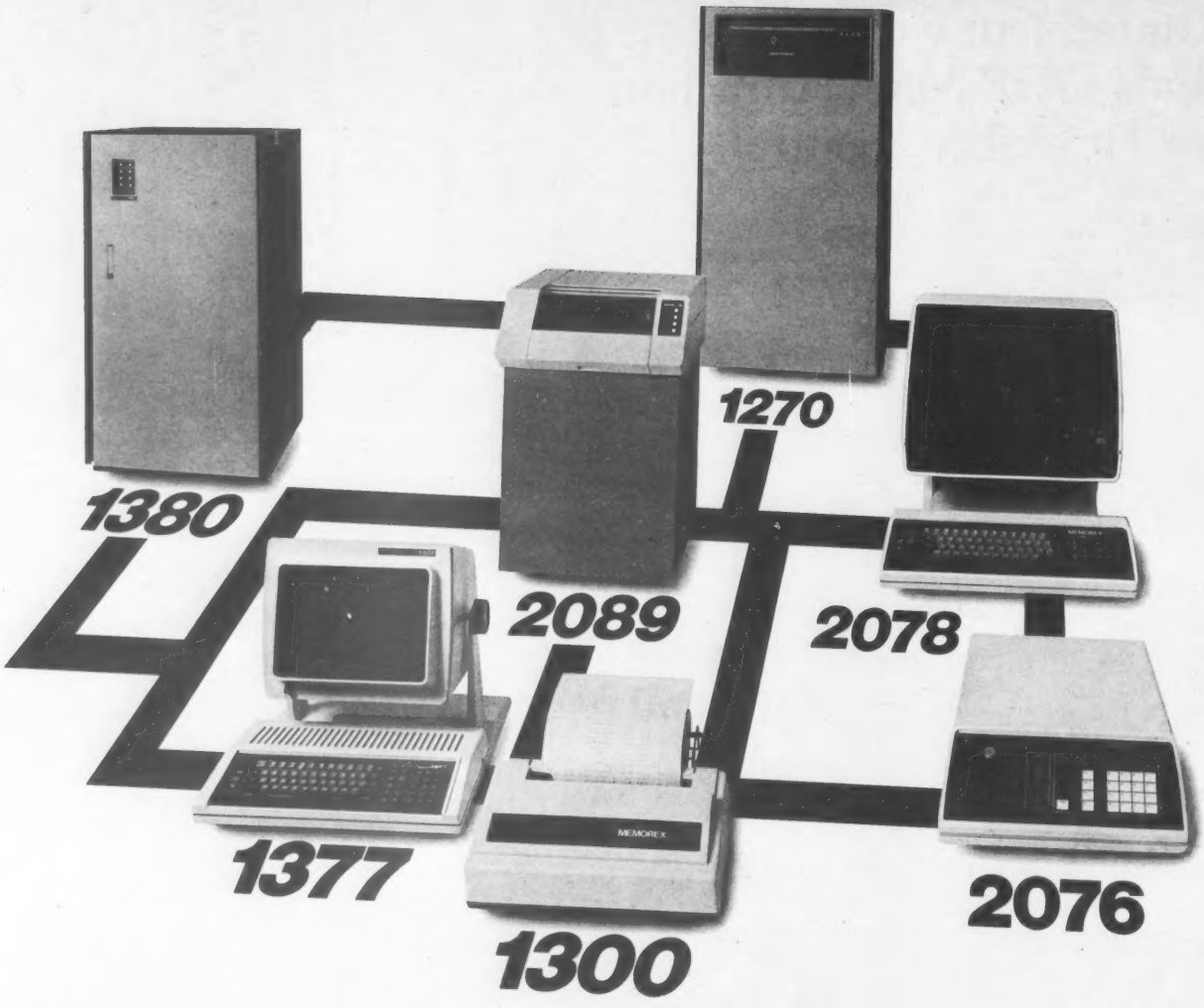


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# IBM 1800 Shop Evolves to State-of-the-Art Net

Special to CW

PAINESVILLE, Ohio — Data processing at Diamond Shamrock Corp.'s T.R. Evans Research Center here started at a time when computer networking was not even a dream.

Back in 1968, the diversified research and engineering company ran computer applications on a stand-alone IBM 1800. Most jobs were real-time data acquisition applications. Six years later, the firm expanded its processing power by installing a Digital Equipment Corp. PDP-15 that was connected to about 20 terminals.

Today, however, Diamond Shamrock has an IBM mainframe and two DEC mainframes that are supplemented by a variety of DEC minicomputers. Processing is done here and in Cleveland and Houston, with all of the computers communicating with each other over the Decnet communications network, according to John Seifrick, the company's manager of computer services.

### Heart of Network

Diamond Shamrock's network system currently revolves around a DEC VAX-11/780 computer, installed recently, with two RP06 disk drives and a TU77 tape unit. But, when the network first evolved, the heart of the computer-to-computer link was a DEC PDP-11/70. Then, back in 1976, the network consisted of three tiers.

"The 11/70 was to be our host machine, the machine on which we would do our program development work, high-level data processing and archival storage. The 11/70 also would support an interactive time-sharing facility for the research staff," Seifrick noted.

The lower levels were going to consist of PDP-11/03s with interface equipment and PDP-11/34s. "However, after we did some preliminary work with Decnet, we ruled out the 11/03 computers," he said. The lower levels as implemented consisted of PDP-11/34 computers and DEC's ICR/ICS process I/O equipment.

In addition, the 11/70 would be able to communicate with an IBM 370/158 mainframe in Cleveland through a 4,800 bit/sec dial-up line. An RJE-Hasp program residing on the 11/70 allowed users of the system to batch jobs to and from the IBM systems in Cleveland and Houston.

### Flexible Implementation

In implementing the network, DP personnel at Diamond had to remain extremely flexible, Seifrick reported. In fact, one of the applications that justified the development of the network actually disappeared as it was being set up.

"We had a big in-house-developed package for analyzing information on gas chromatographs," Seifrick pointed out. "As we began to implement the network and carry over this particular application, it became apparent that individual turnkey microcomputers could do the job much better."

Because microcomputers actually offered more functionality than that of the proposed central computer system and at a substantial savings in programming cost and complexity, the firm changed its philosophy on the support of that whole application. Basically, it changed to one of a higher level of support.

The initial data is now analyzed at a local level, Seifrick stated. "The data is only passed up to a large machine if we need to archive it or do further processing on it."

### Port Selector

For increased capability, the company added the VAX-11/780 superminicomputer with 3M bytes of memory to its network. It has also changed the configuration of its network through the addition of an intelligent port selector option. The port selector allows individuals at terminals the ability to access any part of the network they need to access.

Users of the system can be engineers, technicians or scientists who enter the system through the port selector to a front-end machine in order to monitor an application or start a new application. The data passes through Decnet back to the VAX computer. Using the same terminal, the user then logs onto the VAX machine to further manipulate data, get plots or archive data.

"That same researcher, later in the day, might decide to dial outside to a local time-sharing service, and he can do that also by going through the port selector," Seifrick said.

Secretaries using the word processing system that resides on one of the network's four PDP-11/34 minicomputers, also log onto the system through any terminal, using the port selector, Seifrick explained. An electronic message system is handled similarly.

The intelligent port selector option allows anyone using any of the terminals in the network to create files and run them on any of several large mainframes within the corporation. The user can have the output directed back to a line printer in his building.

"We have people who, when using their terminal, connect themselves to the 11/70 to develop files that are eventually used as input data, say, to a large simulator that is running on a corporate mainframe," he noted. Results can be printed, plotted or spooled back into files on the 11/70.

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# Amusement Parks Find DDP Main Attraction

*(Continued from SR/11)*

Another plus was the Guardian electrical failure protection feature on the 445s. This feature protects the system at each remote theme park from electrical disturbances which might completely erase a system's memory," Dolan stated.

"Also, because we had some good experience — in 1977 and 1978 — with NTI 300 series systems in a remote batch dial-up capacity with one of our service bureaus, this is the direction we chose to pursue in setting up in-house DP."

The 445s are used in three primary modes of operation. "The first mode is in the area of volume-oriented source data entry, which we have given the user in each park," Dolan cited. "They use CRTs, in essence, to transcribe source documents into machine-readable form and to queue those up on a disk file and transmit them to the Data Center.

"The second mode of system use is in the area of what we call 'sophisticated date entry.' Here we use the intelligent processing power and sophisticated validation capability — for example, verifying an account or vendor number — of the 445. And our third mode is that of stand-alone data processing. In this function, our systems are used to process low-volume, rapid-turnaround in-park applications," Dolan explained.

Payroll/personnel, general ledger and accounts payable applications on the 445 have all been written in Cobol. The workhorse task is the weekly 17,000-person payroll application.

"We have a very rapid turnaround in payroll. Our pay period terminates at 2400 — or midnight — Sunday, and we pay not later than Friday morning." A mere four days is taken to collect time cards at each park, have them audited by supervisors, batched, keyed into the system, transmitted to the Data Center and processed, and data transmitted back to each park where checks — together with a complete repertoire of control reports and balancing reports — are automatically printed on the 445.

"All of this takes place in a very, very narrow time window — and there is virtually no room for error, in that 3,000 teenagers who do not receive their checks could be an unruly bunch," Dolan quipped.

It is particularly important — for monitoring the effectiveness of advertising and marketing campaigns — to obtain accurate information about visitors to the amusement parks, Dolan noted. And with an annual turnout of some 15 million Six Flags guests, what better way to process this information than by computer?

"Our park people are very interested to know — on a relatively quick basis — where the guests are coming from," Dolan stated. "We therefore apply statistical sampling techniques to gather data from several hundred to perhaps as many as a thousand attendees at our parks each week. The processed results are then extrapolated to total population attending the park that week."

Data is gathered either from license plates of cars in the parking lots or directly from in-park guest surveys. "In certain of our parks — like Atlanta's Six Flags over Georgia, or Astroworld in Houston — information on a license plate indicates, directly or indirectly, county of origin," Dolan revealed. "The results are used by our operations people, who run the front gates and parking lots, and predominantly by our marketing staff."

Output from the 445 is in the form of a series of hard-copy reports. These documents categorize attendance by a variety of parameters including geographic radius, county and area of dominant influence (ADI). From ADI information, radio, newspaper and TV advertising spots are purchased.

### Pilot Application

The 445 system at the Astroworld park has seen service in a pilot application to prevent unauthorized use of season passes.

"Our season passes contain the photograph of the user and punch card holes to indicate the user number," Dolan said. "We developed a validation program for the 445 using Panasonic badge readers to ensure that the badge is used only once per day for entrance into the park. A favorite trick of the kids is to throw a badge over the fence to a friend, who then comes through the gate.

"Our ticket takers are often too busy to check photos. When a multiple entry occurs, bells ring and lights flash. This application was made possible through the simultaneous asynch and bisynch communications capability of the 445," Dolan noted.

Has the NTI choice been vindicated? "Although we can't quantify time and dollar savings, I can readily state what I think we've achieved," Dolan asserted.

"There is no doubt that we have substantially improved our data processing operation, by very dramatically increasing the number of applications provided to our theme park sites.

"We have brought data processing in-house, established distributed DP at the park environment and extended and expanded application capability — all at no additional cost.

"Trading outside service bureau dollars for inside dollars — while eliminating dependence on others and potentially substantive inflationary price increases — has to be considered a good deal," Dolan said.

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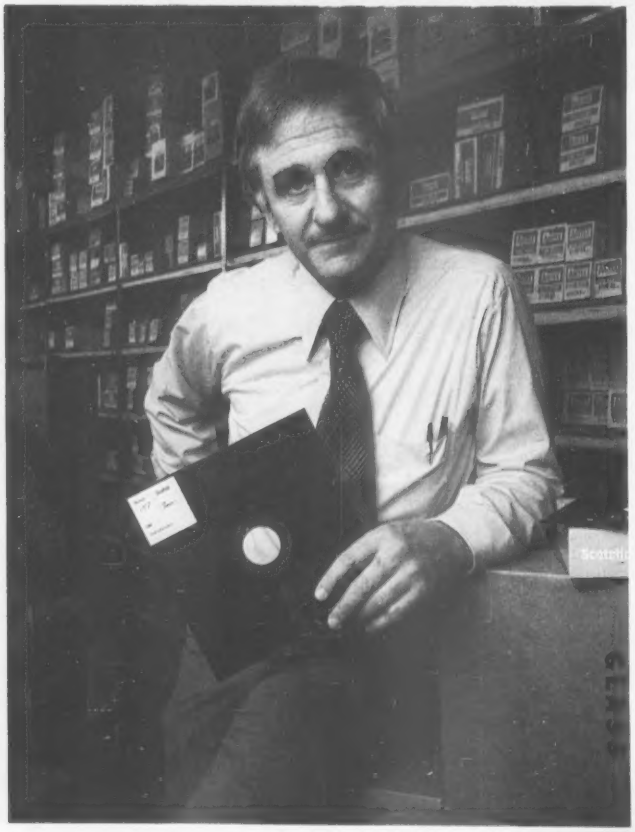

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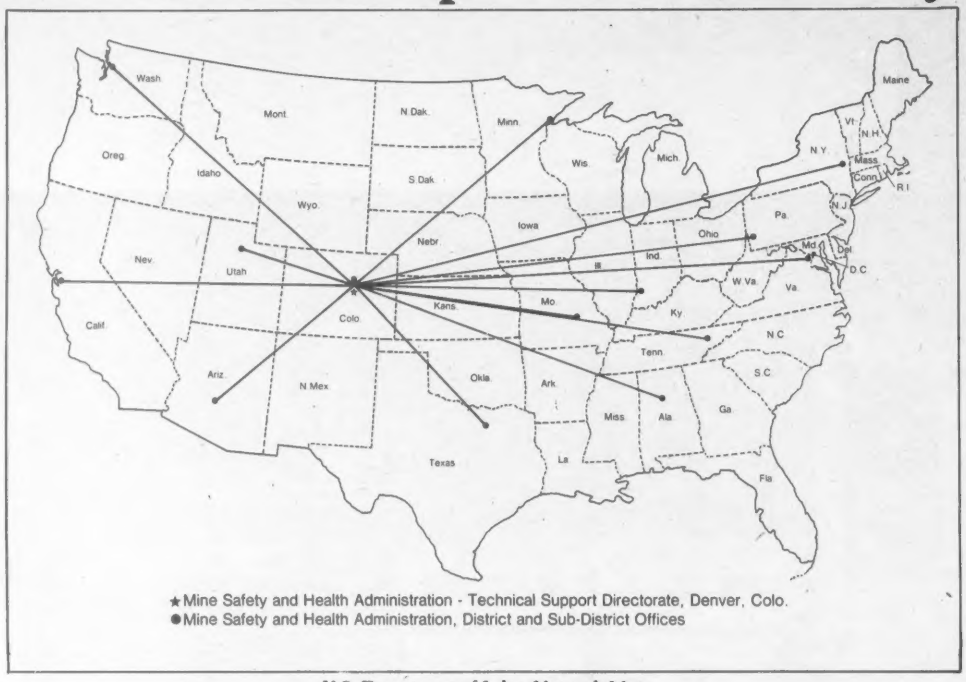
# Mini-Based Net Unearths Improved Mine Safety

Special to CW

DENVER — An agency of the U.S. Department of Labor here is using a network of dispersed data processing minicomputers to further mine safety and help cut down on the administrative costs created by safety reports.

The Mine Safety and Health Administration's Enforcement Information System (EIS), based here, has district or subdistrict offices in 14 cities and a force of about 600 inspectors. These inspectors make about 30,000 inspections a year of non-coal mines. Currently, all of the information collected on these safety sweeps is processed by Datapoint Corp. minicomputers and transmitted back to a central mainframe.

Before the Datapoint minicomputers were installed, remote job entry terminals had been used to send data to Denver. The mainframe spent a lot of its time editing the data before it could process it and add it to its files. But the workstations are themselves minicomputers, capable of doing their own editing and data processing.




**U.S. Department of Labor Network Map**

### Daily Reports

Under the system, information from mine inspection reports are typed into the Datapoint computers and transmitted to Denver on a daily basis. The operators simply key in the codes supplied by the inspectors, filling screen formats generated by the computer. Errors caught by the mainframe are telecommunicated back to the field office computer, where they are printed out, to be researched, corrected and resubmitted to Denver. When the mainframe uses the material to generate reports, it translates the codes into the appropriate capsule narratives.

While the system may sound rather complex, there were no major problems getting it up and running, according to those involved with the system.

"We developed our own programs," Darrell Albee, branch chief with the Application Programming Support Organization, recalled.. "We knew what we had to do to satisfy the Department of Labor's Mine Safety and Health Administration, what we needed here in the Enforcement Information Systems branch, and what the operators needed in the field. We combined all these and tried to be as forward-looking as we could."

All data entry is screen formatted, and many cross-correlations between various fields are in the program. We put in all the checks and cross checks we could, Albee noted. "We wanted clean data for the mainframe and also dispersed data processing power in the field offices." If, for instance, the operator enters the right office but the wrong state when identifying a mine or quarry, the program will flash an error message across the bottom line of the screen, pointing out the problem.

### Training Personnel

Before the system was installed, two agency personnel attended Datapoint's computer operating school in San Antonio for two weeks. "They took existing forms we used in the old system," Jims Ross, EIS computer systems specialist, "plus their knowledge of what we expected from the system, and began converting to the Databus language and worked out the system with very little difficulty.

"We found that an average typist can become completely trained on the entire system in one and a half days — data entry, query, retrieval, telecommunications and stand-alone services," Ross stated.

The delivery date of the system, leased with a purchase-option plan, was March 15, and the entire system was operating in July. Each of the 14 sites has a Model 1800 Datapoint processor with 16K bytes of memory, a double diskette drive and a matrix printer.

The EIS office has an additional Datapoint processor for program development. The system represents the Department of Labor's first Datapoint system.

Today, Albee says the error-reject rate from the mainframe is "almost zilch." The only data still at all subject to significant errors are the mine identification numbers. There are more than 17,000 such numbers, and the file is maintained within the memory of the mainframe itself.

Albee further noted that when the agency issued its request for proposal (RFP) for the system he insisted that the dispersed computers be capable of doing most of their work off-line, going on-line to the mainframe only when they were ready to send it batches of data, thus saving on phone bills.

Although with computer terminal RFPs the vendors usually "come out of the woodwork," Albee said that only two vendors, including Datapoint, were willing to tackle his off-line requirement.

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CW 0223

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Peter P. Blozis (right) is Wilson's Vice President, Information Services Division. Lea Edmunds is Technical Services Manager.

* * *

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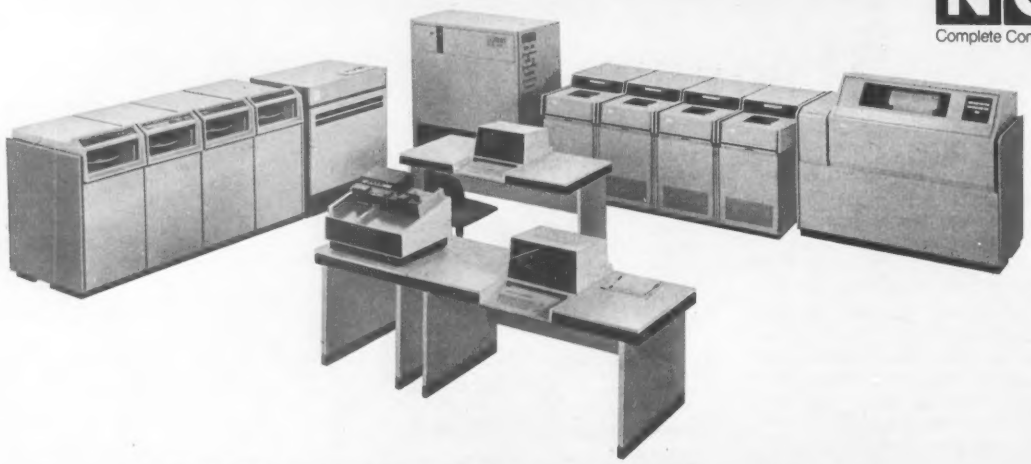

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## *Improved Circulation of Data*

# DDP Spells Relief for Drug Firm's Headaches

Special to CW

CLEARWATER, Fla. — Up until about a year-and-a-half ago, The Jack Eckerd Drug Co. based here, which occasionally dealt in curing the physical headaches of its customers, had a headache of its own.

However, in this case, the 1,000-plus store company's illness was administrative, brought on by impaired circulation of information throughout the firm's 15-state area.

Fortunately, Eckerd found relief through distributed data processing (DDP) which not only improved communications, but tightened management control over its remote operations, according to T.W. Thomas, DP manager.

"I'm not sure if Eckerd was made for distributed processing or if distributed processing was made for us. But I do know that it works very well for us, fitting in perfectly with our practice of delegating responsibility to our divisions," Thomas said.

### DDP Introduction

Distributed processing was introduced to Eckerd in 1979 and since that time it has permitted division headquarters to perform certain information handling jobs in their own offices, using small IBM 8100 Information System processing units that are connected to a host IBM 3031 computer in Clearwater.

These processors bring data processing capability closer to sources of information and result in quicker entry of sales and cash figures and faster on-line response.

Also, entries are validated and balanced on the spot, ensuring that data going into the computer files is "clean" and ready for use in corporate reporting.

The large IBM 3031 processor at headquarters consolidates information coming in from the field and prepares corporate reports and other listings that support division operations. The technical staff in Clearwater is always on hand for programming and technical assistance.

"We are a distribution center-oriented company," Thomas explained, "supplying merchandise to stores from our own warehouses in seven divisions. These divisions, to some extent, operate their own businesses, and they are held responsible for certain financial and accounting procedures, as well as supplying stores."

Sales and cash reporting, in fact, was the primary concern when Eckerd decided to look into the introduction of on-site computer power at division headquarters. "We focused on that first because it appeared to be the wheel that squeaked the loudest," Thomas recalled.

Under the manual system, checkouts, or reports of sales and receipts from stores, came into division headquarters once or twice a week and then were laboriously registered on spread sheets. The paperwork slowed things down, information was inaccurate much of the time and management in Clearwater could not be sure of a division's financial status on a daily basis. Information flowed at a frustrating pace and management control suffered.

Now things are quite different, and the work at Eckerd's seven division headquarters reflects a much more pleasant picture, Thomas stated. At the Florida Division offices in Clearwater, for example, 14 operators of computer terminals perform checkouts for 300 stores quickly and accurately with the assistance of a stand-alone IBM 8100 Information System that fills a distributed processing function.

Similar machines are also installed in the company's Delaware, Louisiana, Dallas, Houston, Carolina and Georgia-Alabama Divisions.

Each stand-alone processing unit includes files for its division and provides for interac-

*(Continued on SR/26)*

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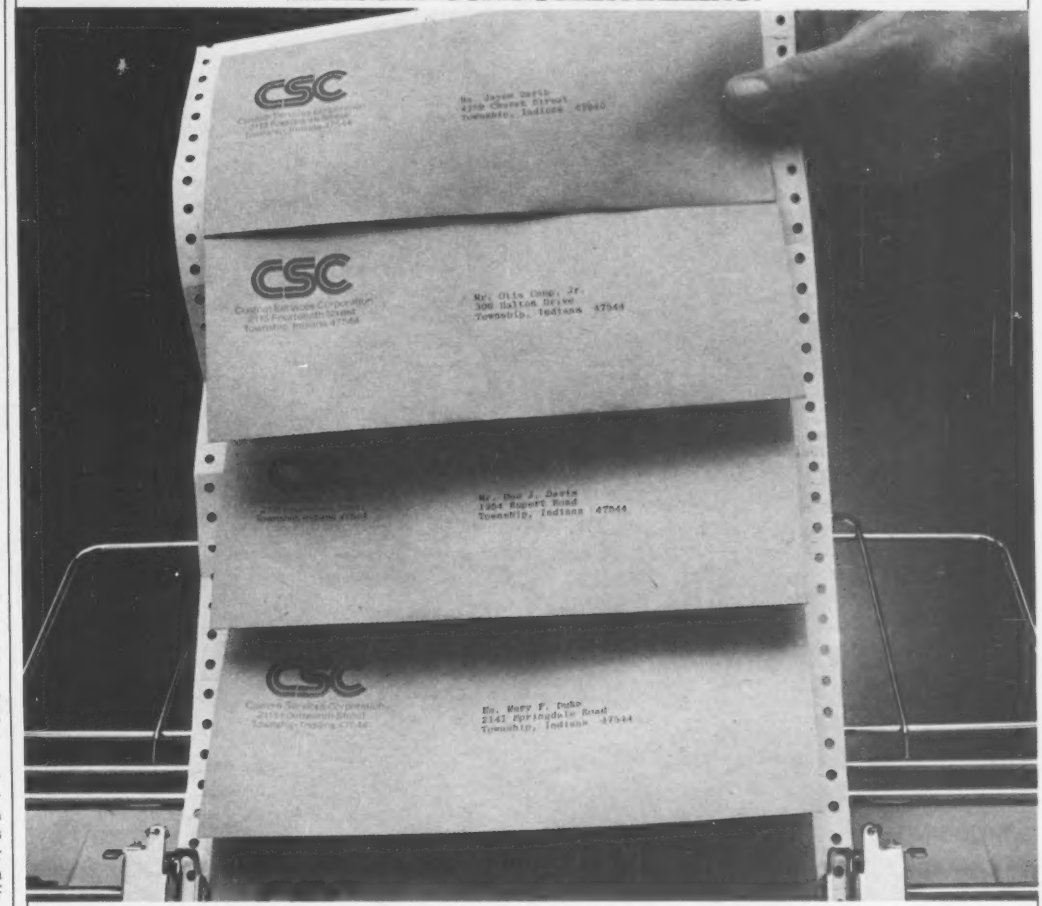


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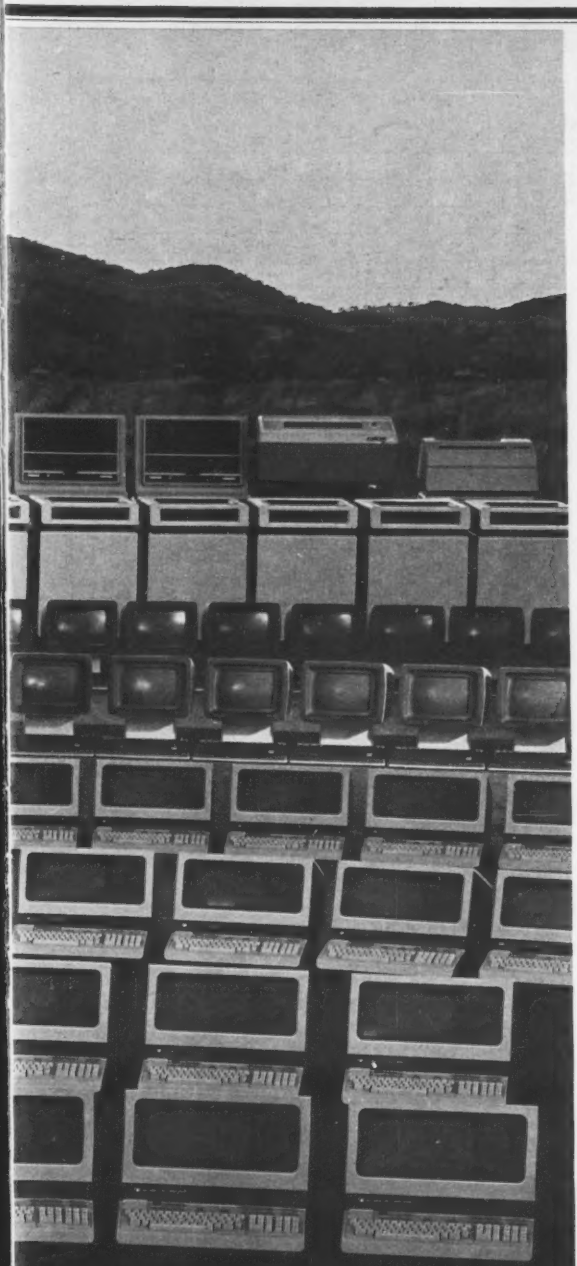

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## *But How to Allocate Roles?*

# DDP Transfers Design Responsibility to User

By Mike Snyder
Special to CW

One of the benefits of distributed data processing (DDP) is that the user community has the potential of taking a more active role in the development of applications software.

However, how should system development responsibilities be allocated to, or wrested from, the corporate users and the data processing or information service departments?

For the purpose of this discussion, the system development process can entail the following steps:

1. Feasibility study.
2. Requirements definition.
3. Request for information (RFI) of vendors.
4. Screening of RFI responses.
5. Request for proposal (RFP) of vendors.
6. Criteria development for assessment of RFPs.
7. Assessment of RFPs in light of the developed criteria, and vendor selection.

If no vendor is selected, the following steps are undertaken:

8. External design and user's manual.
9. Internal design and programming specs.
10. Programming and testing.
11. Installation, review, and adjustments.

In the foreseeable future, both the corporate users and information services will each be expected to contribute in each of these steps. But what will the ratio of contribution be? Answers might be found by asking the following questions:

- Is the problem best solved by the use of new tools such as a new programming language or a new file access language?

The ratio will be low and users will have to take a passive role if this is the case. This is because involvement of information services is inevitable in any DP problem, given enough time — and if the solution involves new tools, we must dominate the situation or else give up hope of having any role at all.

- Is the problem one with which the users have had DP experience in the past? If so, the ratio should be high, because the users should have a good deal of actual business experience to the point where they can tell what is needed and what the solution should encompass.
- Does information services have practical business expertise in the problem at hand, and if not, is it easy to come by? If the answer is no to both questions, then the user's contribution to the problem solution should be high.

Information services may well deal with issues of "DP technical" acceptability and data security, and yield to higher authority on most other points. Our contribution might be significant only in steps 6, 8, 9, 10 and 11. If the answers are yes and/or yes, then we would assume whatever role is indicated in light of our allocable manpower and the answer to the next two items.

- What is the level of DP literacy in the user? Superficially, we can infer that the higher the level, the higher the ratio. However, the emotion-charged qualities of this question are bound to get us embroiled sooner or later.

In this case, if our reservations go deeper than the enforcement of our position as high priests, we must answer these questions: Is this user literacy likely to continue in the event of personnel turnover? Will it remain in effect over the next five years of EDP technical evolution?

If the answers are yes, then perhaps we should prepare to learn some lessons by which we may upgrade our shop. If not, we should invoke a blizzard of esoteric technical issues and/or a patronizing attitude.

*'Involvement of information services is inevitable in any DP problem, given enough time — and if the solution involves new tools, we must dominate the situation or else give up hope of having any role at all.'*

If this does not solve the problem, and we still feel fundamentally opposed to a high ratio, then we should make every effort to get the users transferred into information services so that we may learn from each other. The transfer need endure only through installation of the system, unless all parties are in favor of its being permanent.

- How long has the distributed processing system been in use? When the system is first installed, we expect to be quite conservative regarding what the users can do with it.

As the corporation becomes more comfortable with this new tool, we may expect that the users will assume more responsibilities if other issues do not prevent it.

*Snyder is a senior programmer and systems analyst at Kaiser Foundation Health Plan, Inc. in Oakland, Calif.*

**ALLOCATION OF ROLES IN SYSTEM DEVELOPMENT**

| Development Phase \ Condition | Using New Tools | Users Have DP Experience | IS[1] Has Business Expertise | Users Have DP Literacy | DDP in Early Stage |
|---|---|---|---|---|---|
| Feasibility Study | O | H | O | H | L |
| Requirements Definition | O | H | O | H | L |
| RFI[2] Creation | L | O | O | H | L |
| RFI Screening | O | H | O | H | L |
| RFP[3] Creation | L | O | O | H | L |
| RFP Criteria | O | H | L | H | L |
| RFP Assessment | O | H | O | H | L |
| External Design | L | L | L | H | L |
| Internal Design | L | L | L | H | L |
| Programming | L | L | L | H | L |
| Installation | L | L | L | H | L |

Legend: L = Low user involvement
H = High user involvement
O = Little or no effect, other things being equal

If the statement at the top of one of the five columns is true, then the ratio of user involvement to information Services involvement might be as indicated in the legend.

Footnotes
1. Information Services department
2. Request for information
3. Request for proposal

**The matrix shown above is a condensation of system development responsibilities. The 11 development steps are listed down the left side and a paraphrase of each of the five above considerations across the top. The data within the matrix is based on the aforementioned ratio: an "H" signals high user involvement, an "L" signals low, and a "0" signals little or no effect. This effort is highly subjective, since it deals with abstract users and projects.**

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# DDP Spells Relief for Drug Firm's Headaches

*(Continued from SR/21)*
tive, on-line updating during the day and processing of information peculiar to the division during the evening hours.

Results of this processing are then transmitted to the host computer for consolidation and preparation of corporate-level reports and other listings that are transmitted back to division headquarters.

Information from all sources is keyed on IBM 3276 and 3278 video display terminals and entered into the files of the on-site processor. As this is done, the processor validates amounts keyed for each register. If the amounts are unreasonable, messages to that effect are flashed on the terminal screen.

During evening hours, a printer connected to the processor produces checkout documents, including one worksheet for each store. This sheet reports total sales, deposit totals, charge card transaction amounts, and overages or shortages for each register.

### Inquiry Function

Terminals used with the on-site processor also serve an important inquiry function. The data entry supervisor, for example, can display information connected with a particular register to check any item entered during the checkout procedure.

Store totals can be checked and status inquiries can also be made to indicate the number of stores for which checkouts have been completed or the status of one store's checkout.

Terminal operators may retrieve detailed information on any store in the division. This data includes the store telephone number and address and names of the manager and assistant manager. Even the serial numbers of registers in a store can be determined through terminal inquiry.

### Key Enhancement

Gerry Revere, Florida Division office supervisor, believes that enhancement of the inquiry function is one of the most important aspects of the new sales and cash system.

"The response time is much faster than it would be if we had to wait in line to retrieve information from central files. This enables me to answer questions from stores and from headquarters quickly and accurately by using the terminal on my desk," Revere said.

Reliability of information ranks high as a distributed processing plus with Robert K. Ramsden, vice-president for data processing at Eckerd.

"With data entry much closer to sources of information and with on-site editing being performed, we feel much more comfortable. We know we're dealing with timely and accurate data whenever we tap our computer files," he said.

Ramsden also stressed division-level independence from the central computer operation as a major benefit. "Distributed processing supports interactive remote operations and reduces dependence on headquarters computer facilities.

"We must work fast if we are to keep up-to-the-minute control over financial operations, and we've found that information can be handled much more efficiently at the division level," Ramsden said.

Eckerd's system was in development for two and a half years and about five man-years of effort were invested. It has paid for itself, however, in less than one year.

Executives there emphasize the fact that the 8100 machines provide these capabilities without costly training programs for the people to run them. For example, Eckerd realized it could not put complex machines in an office environment among people with little or no DP experience.

"Routine operation of the processor, however, does not require expertise," DP chief Thomas explained.

"The software that IBM provided makes the technicalities of operating the equipment transparent to the user and the designers of the Eckerd system built in a lot of additional simplification, such as the use of English-type commands, to make procedures as straightforward as possible."

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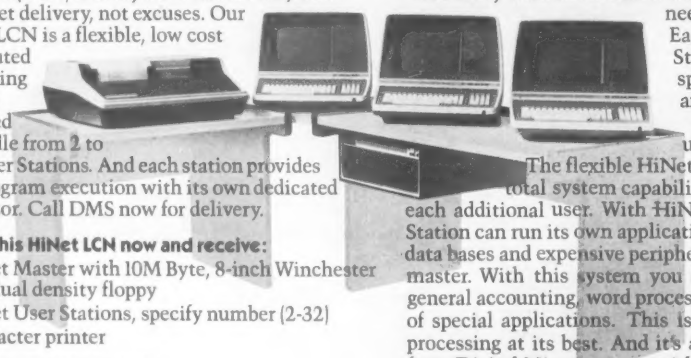

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*Helped by Front-End Approach*

# Effective DDP Demands Simple, Fast Network

By Larry Gardner
And Kathy Graham
Special to CW

For a distributed data processing (DDP) system to work effectively, the communications network that connects the distributed elements (nodes) must be simple, fast, flexible and reliable. Experience shows that the processing load on each node required to support internodal communications uses a substantial portion of that node's resources.

Therefore, an additional requirement of the communications network is minimization of the communications-specific processing load of each node. A network front-end (NFE) approach to distributed processing satisfies each of these requirements.

Recent advances in microprocessor and large-scale integration technology have permitted substantial increases in the capabilities of a network interface, while sacrificing little in additional cost. A substantial computational capacity can be incorporated into the network interface, permitting the movement of network functions from the node (for example, host computer) to the network (interface).

This microprocessor can then support protocol interpretation and other network functions that were previously performed on the host computer. Advantages of offloading this protocol software from the host are realized in performance, cost and flexibility benefits. The front end provides a tailored communications processing facility, and as more host resources are made available for applications, the performance of the system as a whole is greatly increased.

### Protocol Software

Protocol software in the network front-end need be implemented once only: Maintenance of that software is therefore restricted to the front-end with no need for multiple versions as new types of hosts are attached to the network. Modest hardware costs may be incurred (each new node added to the network requires a front end, though a front end can support multiple nodes), but additional software costs are minimal.

The front-end approach insulates the host from the details of the protocols and transmission medium used, thereby permitting the flexibility to change either protocol or medium without affecting host software. In order to provide further detail to the NFE approach, a basic understanding of the communications functions in a distributed system is required.

The functions that must be performed in a communications network are divided into communications protocols. Communications protocols are required to effectively manage the use of network hardware and provide basic services. For example, protocols are necessary for error control, maintenance of proper sequentiality in a data transfer, routing and congestion control. Protocol, as used here, means the set of rules that govern communications between cooperating modules, where the modules can be in separate network elements.

The experience of network designers has shown that a hierarchical arrangement of protocols into a "protocol architecture" is the best approach for a variety of software engineering reasons. Layering of protocols is one of the most effective means for structuring a network design: Each level uses the functions of the lower level and adds some functionality of its own for possible use by the next level. Provided that suitable interfaces are maintained, an implementation at one level can be modified without impacting the overall structure, helping to simplify both the design and the implementation.

*(Continued on SR/28)*

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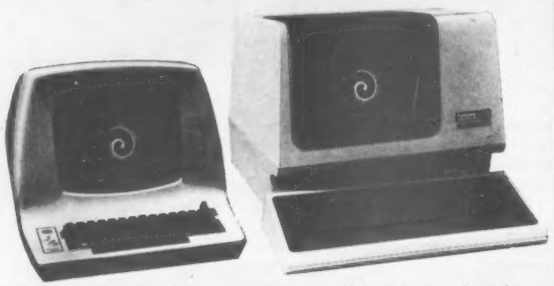

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# Effective DDP Demands Simple, Flexible Network

*(Continued from SR/27)*

Currently, efforts by the International Standards Organization (ISO) and American National Standards Institute (Ansi) include the definition of a reference model for Open Systems Interconnection Architecture (Osia), the basis for level architecture for distributed communications.

### Layered Setup

Protocols are layered, with higher level protocols building on functions provided by lower level protocols. This layering approach partitions functions cleanly and simplifies protocol interfaces. The decision as to where and how the protocol is implemented determines the allocation of communications functions in a distributed system.

The four approaches of host-network interfaces described below provide equivalent functionality in a distributed environment. These vary in the amount of functionality provided by the network interface, which is directly related to the processing power and buffering capability of the interface device.

The scale is from little processing power and no buffering capability to the maximum power and capability provided by the NFE.

- The host-resident interface performs all functions of a network node and drives the communications medium directly through a device driver or channel interface. This approach is frequently used for close coupling of pairs of processors.
- Link support is interfaced to the communications medium by a network interface, providing the host with some insulation. The host drives the interface with commands to send and receive messages of predefined format and variable size to variable destinations.

The host is responsible for formatting messages to suit the network interface. The interface is capable of buffering up to one complete message on behalf of the host. The interface implements a physical interface to the medium and a link control discipline.

- An end-to-end support interface adds end-to-end reliability and sufficient buffering to implement the buffer multiplexing necessary for the integrity of end-to-end data delivery. The host is fully insulated from the communications medium, its control and management.
- With the network front end, the interface unit is large and powerful enough to contain all the protocol layers necessary for network interconnection.

It is designed to work in conjunction with a simple host to front-end protocol to enable user access through one or more special-purpose devices. The transformation of process-specific and host-specific information and the control of process-to-process communications sessions would still be host functions.

While the NFE approach puts the communications power into the network, a broadband bus approach gives breadth to the spectrum of communications supported in a distributed system.

Within a distributed processing system are a wide variety of devices communicating via the following basic traffic types: low-cost/low-performance interactive terminals to and from computer-based and higher cost/high-performance computers to and from other computers.

The network over which the distributed processing is to take place should provide a common data communications system that serves all types of traffic, lowering the overall communications cost and providing the first step to a truly integrated communications channel.

Considering the dynamics of the distributed processing environment, user requirements and device communications traffic characteristics may change and grow over time. Such situations are facilitated by network front ends and bridge units that are frequency. agile and therefore able to change channel assignment when necessary.

These capabilities built upon broadband coaxial cable set the stage for the advancement of the distributed processing discipline.

### Advanced Services

As network capabilities increase, distributed processing system requirements expand accordingly. Network front ends are now evolving to support advanced network services, hence becoming fairly sophisticated processors themselves.

A few of these advanced services include:

- Directory Services: Translation of alphanumeric node names into network addresses, allowing users and processors to state information destinations symbolically.

Directories containing a number of names for the identical network node may exist, depending upon user group structure.

- Data Management Services: Network provides support for distributed data base management, with distributed data directory and data dictionary services and with specialized access and command structures to data base machines on the network.
- Dynamic Configuration Support: Automatic detection of node existence and modification of node connection requirements, with resultant initial and revised configurations, is important considering the dynamic and growth potential for distributed processing applications.
- Status and Performance Monitoring: The operation of any network with geographically distributed equipment requires collection of status information of equipment and evaluation of overall network performance; error rate, throughput and delay.
- Distributed Network Control: The combination of dynamic configuration support and status monitoring can be used to automatically detect network failures and control network reconfiguration, restoring and evolving network services when necessary.

*Gardner is program manager and Graham is a senior member of the technical staff at Sytek in Sunnyvale, Calif.*

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*For Traffic Safety Reports*

# System Pieces Together Auto Accident Data

Special to CW

SALT LAKE CITY, Utah — The flashing lights of a Utah Highway Patrol cruiser mark the scene of a traffic accident, one of 40,500 reported in the state last year. Medical aid has been provided to the injured and wreckers have removed the damaged vehicles. Soon traffic has resumed its normal flow. Now the paper work begins, as the police officer completes an accident report.

Several weeks later, this accident report, like thousands of others, arrives at the Utah Department of Transportation here. The Division of Safety must review each report for completeness and accuracy and enter the data into the department's extensive data base. The information is used to produce recurring and special reports on highway safety as required by the state government and various federal agencies.

*'Not so long ago, if you wanted information about some aspect of highway safety, you had to gather it yourself because no one else collected it just the way you wanted it. Today, we have a central repository for a tremendous volume of geographic and traffic accident data.'*

By 1978, the growing volume and complexity of these reports had overwhelmed the department. "Our traffic accident data base at that time was not user-oriented and consequently it was not very responsive to our needs," said C. Arthur Guerts, a safety studies engineer with the Division of Safety. "For us to gather and store accident data is not enough. If we can't access data when we need it and put it in the proper format, we're only solving 10% of the problem."

The old system could not produce the kind of reports required by the Federal Highway Administration, so the department began to explore ways to develop a more versatile program.

### User-Oriented Program

Following a recommendation from the Federal Highway Administration (FHWA), the Department of Transportation decided to anchor its new accident records program around the Mark IV file management system developed by Informatics, Inc. After investigating and ultimately rejecting several other approaches, the department turned to the General Electric Information Services Co. (Geisco). Working in concert with the Division of Safety and in consultation with FHWA personnel, Geisco's Custom Applications group developed a user-oriented software program called Cars (for Central Accident Records System).

The host computing services medium for Cars is Geisco's IBM-compatible Mark 3000 Service. Cars employs the Mark IV file retrieval system to store, manage and report traffic accident data and a Marklink terminal to provide for local data entry. "We found the single-source capability offered by Geisco to be very helpful in integrating all the elements required for the Cars application," David G. Blake, chief of administrative services for the department, said. "There were a lot of pieces that had to come together."

Cars allows the department to collect, store, update and delete traffic accident and geographic data on a statewide basis and to generate recurring and special reports. Unlike the department's previous system, Cars meets the standards established by the National Highway Traffic Safety Administration for maintaining accident records.

Traffic accident and geographic data is immediately retrievable, Blake noted. This has allowed the department to reduce its timeframe for reporting considerably. Recurring reports are regularly scheduled and involve fixed formats.

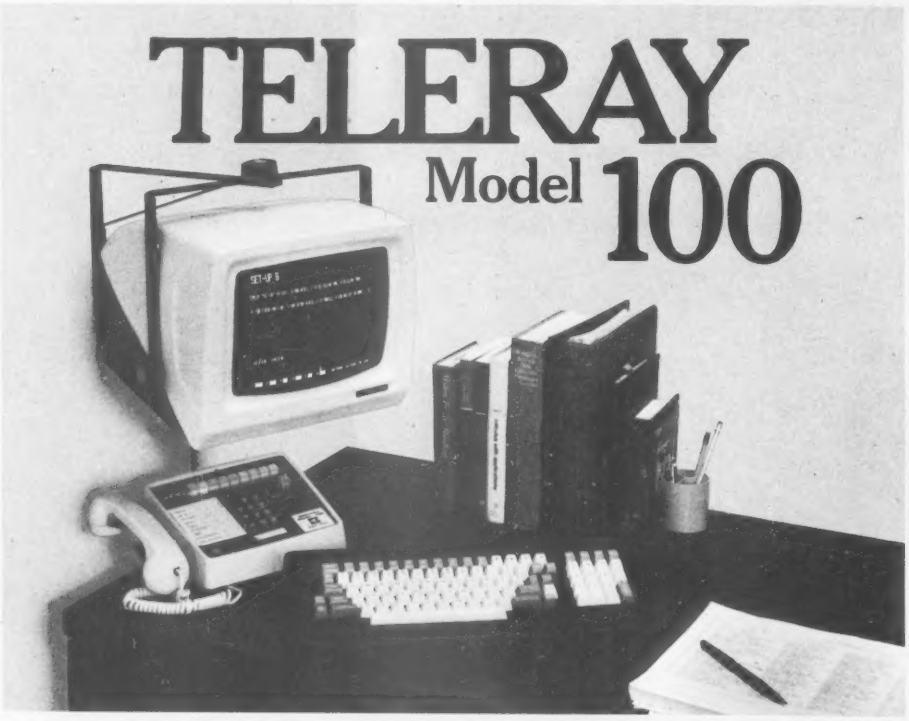
Special, or ad hoc, reports, on the other hand, represent a real challenge for any data processing system. The Department of Transportation used to generate all ad hoc reports manually. To answer a question about a particular accident, road or intersection, personnel had to manually extract the data from sequential files, which was a time-consuming procedure. Now they can dial up the Mark 3000 service and query the data base for such information, Blake explained.

### Meaningful Comparisons

While highway safety traditionally has been thought of in terms of numbers — accidents, injuries or fatalities — numbers alone are not a true measure of highway safety, Guerts stressed. They must be evaluated in

*(Continued on SR/34)*

TELERAY
Model 100



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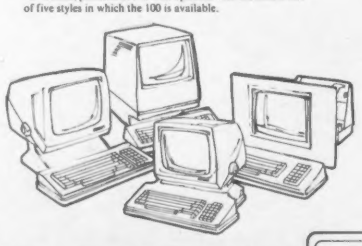

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# System Pieces Together Auto Accident Data

*(Continued from SR/32)*

terms of a unit of travel, such as millions of passenger or vehicle miles. Then the accident rates of a high-volume interstate highway can be compared with that of a low-volume country road.

"This is where our geographic file is invaluable," he said, "for it gives us a measure of traffic volume that permits us to calculate accident rates. Now we have a common denominator that allows us to make meaningful comparisons."

Cars permits department personnel to query Mark 3000 service for data about specific accidents, highways or intersections. In addition, Blake said, personnel can take a "window" of various sizes and "slide" it along the highway, observing the number of accidents that have occurred in a given area of interest.

"This is a very complex task and many proficient programmers have gone down in flames trying to accomplish it," he observed. We can produce such a 'slider scale' for the entire state now in a matter of hours. Before Cars, it would have taken a year to do that, if we could have done it at all.

"In effect, Cars has allowed our coders to become analysts. Our technicians now can devote more of their time to analysis rather than just gathering data," he noted.

### Reference System

One of the most valuable aspects of the Cars program was the development of a standard Highway Reference System used throughout the Department of Transportation. A common geographic data base ensures that all personnel use the same terminology to pinpoint a particular location, whether it be on a federal, state or county highway. Communication among various divisions has improved now that they share a common reference base, Blake reported. "In fact," he said, "if the Highway Reference System were the only benefit from Cars, that alone would probably be worth our investment."

Additional benefits have resulted from Cars, particularly in the area of data entry. By installing a Marklink Terminal in early 1980, the department streamlined its data entry process. "Before we acquired the intelligent terminal, data entry was one of our system's weak links," Blake explained. "Now, several keypunching, rekeying and error-correcting steps have been eliminated. With its off-line editing feature, the terminal allows operators to correct any keypunch errors before they enter the system."

The department has achieved a data entry accuracy rate of 95% on the first pass with the Marklink terminal, Blake claimed. With its former system, it took several iterations just to get 80% accuracy. Because all data editing takes place in an off-line mode, there are no connect charges from Mark 3000 service during this process.

The Department of Transportation must analyze traffic accidents and ferret out what actually caused them. Was it a roadway problem? Did something break down on the vehicle? Was it a miscalculation by the driver?

As Cars helps the department gain more and more information about highway safety, it becomes more of a scientific discipline, according to Blake. "Not so long ago, if you wanted information about some aspect of highway safety, you had to gather it yourself because no one else collected it just the way you wanted it. Today, we have a central repository for a tremendous volume of geographic and traffic accident data," he said.

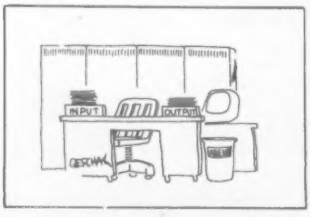
Cars provides all interested agencies with analytical material to help them develop strategies for improving highway safety. For example, data gathered, stored and analyzed by Cars is used to initiate improvements on Utah highways to make them safer for the driving public.

"Highway safety is such a complex issue, with so many aspects, that it is absolutely essential to have a good data base," Blake stressed. "But that data base has to be so broad and comprehensive that, without a system like Cars, we couldn't maintain it."

"Without such a data base," Guerts added, "highway safety would regress to the point where we were trying to work with bits of information or a few pieces of the puzzle. We must be able to see the big picture."

As the resources available to the Utah Department of Transportation diminish because of inflation or reduced revenues, the need for better, more accurate data increases. The Central Accident Records System is helping to provide information needed by the department to make wiser decisions.

"We're going to have to make wise decisions about building or not building, or selecting this project over that project. The system is providing the data we need to ensure that we are expending our limited resources in the right places," Blake concluded.

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*Administrative Delays Cut*

# Welfare Saves Money While Giving It Away

MADISON, Wisc. — It is a hard job to save money in a government office that was designed to give it away. But in the Wisconsin welfare department, a new system is reducing administrative delays and other vexations while saving substantial sums of money for the state.

The system is the Computer Reporting Network using distributed data processing (DDP) techniques. It sharply reduces the time lag between application for aid and eligibility and benefit determination. It also ensures equal welfare treatment statewide because the same policies are applied to individual client information regardless of which worker in any of the 72 counties or four Indian tribes takes the application.

"These were primary goals in creating the Computer Reporting Network," Bernard Stumbras, administrator of the Division of Economic Assistance of the state's Department of Health and Social Services, recalled.

"Results to date have exceeded expectations. The time required to determine an aid applicant's eligibility and benefit amount has been slashed by 50%," according to Stumbras. "And the system applies eligibility criteria with absolute consistency, time after time.

"But these are by no means the only contributions of the new system," Stumbras continued. "Our Economic Assistance Program is locally administered and state supervised, and the distributed system eliminates a vast amount of clerical paperwork at both the local and state levels. The often overburdened eligibility technician, whose time is now freer to work with clients, is a major beneficiary."

Others who strongly benefit from the system, Stumbras said, are the payroll statistical staff in the local offices and the local officials responsible for welfare administration. "The system removes a heavy work load from the eligibility technicians and gives county officials information to help them better manage limited money and manpower resources.

"At the state level, savings stemming from the system amount to hundreds of thousands of dollars, with even greater cost savings in sight," Stumbras claimed.

IBM's 8100 Information Systems are key elements in the Computer Reporting Network, according to Paul Pecorin, director of Office Information Systems for the Department of Health and Social Services. "We now have 20 of the 8100 systems installed at local offices around the state," he noted.

Each of the 8100s is linked via phone line to an IBM 3033 host computer at the state's data center here. Each is similarly linked to its own satellite group of smaller local offices which are equipped with on-line visual display and printer terminals.

The 8100 systems at the local level and the host computer at Madison interact to control and expedite the processing of all aid applications and eligibility determinations. The 8100s pre-edit, organize and transmit application data. The host computer performs additional edits and validity checks, determines applicant eligibility and benefits and transmits its findings back to the local 8100.

### Combined Applications

Basic to this interaction is a combined application form that the state has developed to capture applicant data relating to the three types of economic assistance processed by the computer: Aid to Families with Dependent Children (AFDC), Medical Assistance and Food stamps. The switch from three separate applicant forms to the combined form, together with the common data manipulation made possible by the new distributed system, is expected to save the state an estimated $1 million annually.

Working from the combined application form, the local-level terminal operators use on-line CRT terminals to enter the applicant data into the local 8100 system. The system guides the terminal operator step-by-step through the data entry process and data is edited as entered. If an error is found, the 8100 immediately displays an error report.

If the data entry passes the edit checks, and if the host computer is currently available, the 8100 transmits the application to the host. Should the host not be currently available, the 8100 has the capability to queue and store the application data that has passed the preedit to be sent on as soon as the host does become available.

"The ability of the 8100 to queue and store transaction data is vital," according to Pecorin. "The entire application/determination processing cycle starts at the local level and we simply cannot allow application data entry from the local level to be shut off because of the temporary unavailability of the host computer."

The Department of Health and Social Services envisions greatly expanded use of the 8100s to support economic assistance and other welfare programs.

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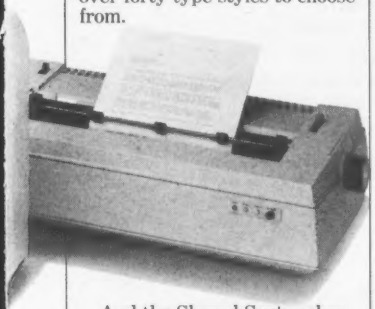

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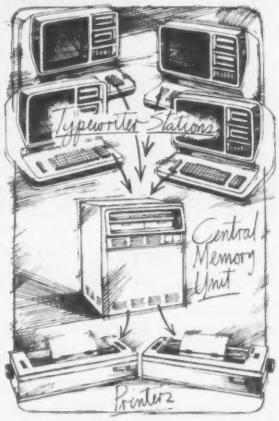


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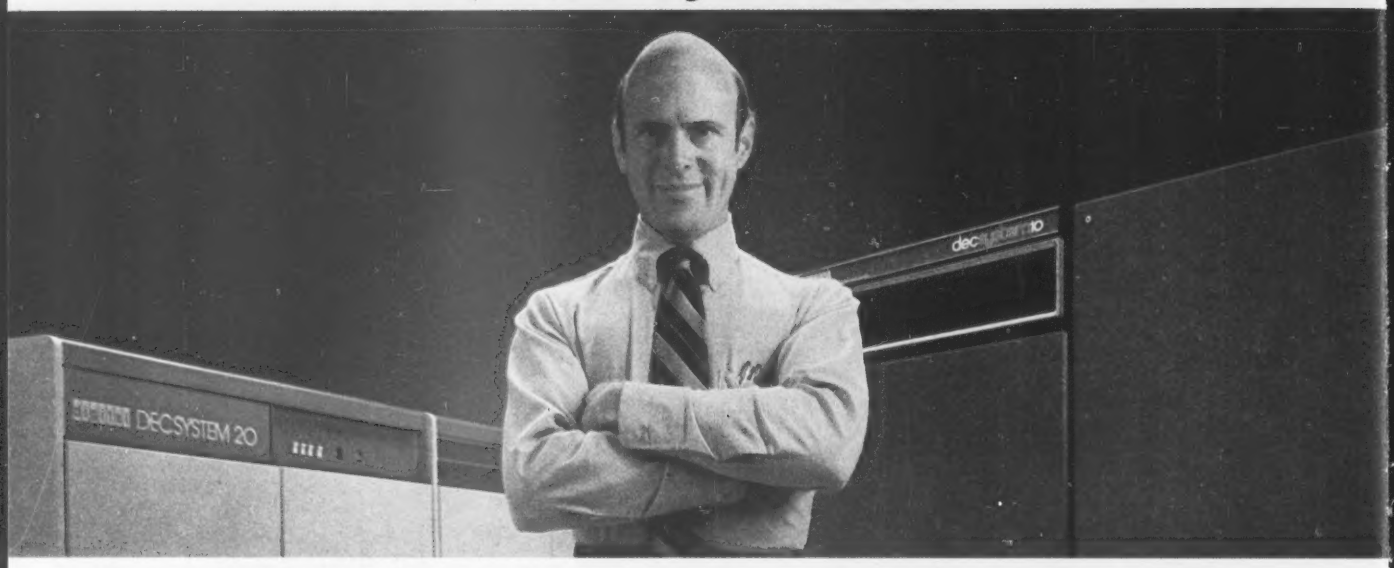


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**We change the way the world thinks.**

# Users' Role Expanding In DDP Development

By Kenneth R. Brown
Special to CW

Consumers are, by nature, never happy with the status quo of products. And within the computer industry, users have exerted a direct and positive impact on product enhancements. In stark contrast to the 1950s and 1960s — when a few computer gurus controlled the DP business — the '70s and '80s have been an era when users have played an increasingly active role in stating their needs.

As a direct result of this self-assertion and of the concomitant technological advances in chip miniaturization, industry response has been nothing less than overwhelming. An endless stream of new products has been steadily flowing from this prolific portion of the economy. Incredible as it is in these times of double-digit inflation, each new system seems to exhibit a better performance/price ratio than its predecessor, with the end not yet in sight — all for the benefit of the end user.

The name of the game is increased productivity.

We've come a long way since the days when every DP job was performed in batch mode for those few large corporations that could afford the price tag. And the price was more than simply dollars. Source transactions were written on coding sheets that were sent to the batch control department where they were balanced and totaled. The source document was then funneled to a centrally located area for card punching or paper tape generation, and finally on to a data entry area for machine loading.

Those of us who experienced it remember full well the frustrating scenario — number-crunching mainframe power bogged down and bottlenecked by inefficiencies. Initial editing, processing against a data file, updating data files and report production.

Errors either surfaced when the computer stopped; or even worse — in the hard-copy printout of a management report. Corrections required a complete repetition of the entire job cycle — perhaps several times. And all of this inefficiency was completely out of the end user's control. We had no handle on our own destiny.

But that appalling situation has long since changed as end users are more strongly and clearly voicing their needs.

And what are the needs that have triggered what is perhaps the most widely publicized DP concept of the '70s and '80s — distributed data processing (DDP)? Timely access, ease of use, dependability and economy — together they spell high PRODUCTIVITY. The desire to gain control of local departmental operations while still retaining instantaneous access to a large shared corporate data base is paramount to literally every end user. And distributed data processing promised to satisfy that desire.

### One Definition

There are undoubtedly as many different definitions of DDP as there are of a computer. However, many major computer manufacturers today agree that a DDP environment is one in which intelligent terminals or computers — with telecommunications capability — perform local on-site jobs and communicate results to another system via an in-house cable network or over long-distance telephone lines.

The two primary advantages that DDP systems offer over earlier standalones are: the capability of simultaneously processing several different tasks with a single CPU as well as modular expandabiliy to cost-effectively fill users' growing needs. The DDP trend has been from centralization with heavy work load bottlenecks to decentralization with shared work loads. "Place the work directly in the hands of those who are most knowledgeable about it and who are responsible for its completion" has been the motto.

Although literally any small business is a potential DDP user, major DDP markets include large manufacturing/-distribution companies, federal and state government and financial institutions. A bird's-eye view of how this approach is helping a cross-section of users may be illuminating

### Pulp Maker

A leading bleached pulp manufacturer is a user of Nixdorf Computer Corp. 600/55 and 600/25 distributed data processing systems. The company had to provide timely pulp production and inventory shipment reporting, order entry, payroll and accounting applications.

But its primary need was automation of the maintenance records for 100,000 pieces of machinery. The host mainframe could not be used to support a data base package because of core limitations. And five keypunch machines were used for existing batch operations.

Higher productivity was sought by distributing data entry to user sites so edits could be made during data entry. The solution was an on-line electronic repair manual that was the basis for the company's automated equipment service assistance program. Immediate access to a reservoir of information is now carried out through terminals dispersed throughout six maintenance shops, four skill shops, an engineering area and maintenance headquarters.

A 30-ft by 50-ft office filled with a myriad of drawings has been eliminated — together with the associated cross-referencing duplications. The sysems also serve as a communications link for receiving orders and for transmitting shipment information between corporate headquarters and mainframes at two parent company sites. Lost or outdated maintenance records are a problem of the past and manufacturing equipment downtime has been drastically reduced because of powerful indexing and data base capabilities used in a DDP environment.

A large savings and loan association is an example of the recent transformation trend from DDP to distributed information processing.

Buried by data entry, the main concern of this user was to relieve the data entry staff from a heavy punchcard work load. Six card formats have been compacted into a single format on a video display screen, dramatically sim-

*(Continued on SR/39)*

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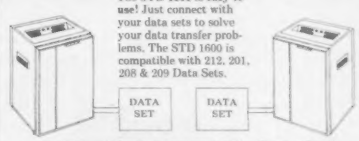


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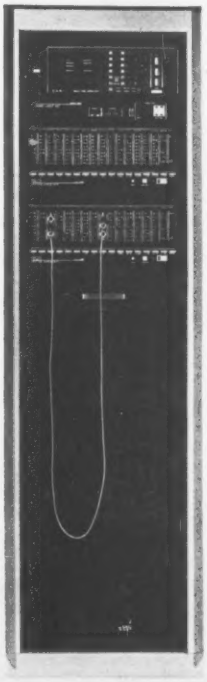

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# Secure DDP Systems Require at Least Two Lines

By Clyde A. Laasko
And Thomas M. Weinberger
Special to CW

CHICAGO — A secure and successful distributed data processing (DDP) system requires at least two lines of on-line defense. The first line is functional and is imposed at the time of sign-on, while the second is organizational and comes into play past the sign-on point.

United States Gypsum Co.'s (USG) distributed system is a CICS network that consists of more than 200 terminals located in 70 places across the country and in Canada. These locations include divisional offices, manufacturing plants, subsidiaries and corporate service centers. On an average business day, more than 70,000 messages are processed, ranging from plant data collection to a complex sharing of data bases.

Recently, the company installed On-Line Software International, Inc.'s Guardian security package in its production CICS system. Until the installation, the only active on-line security systems at USG were the traditional CICS sign-on and several application-level security systems.

Since 1976, the company has been in the midst of developing large customer service, manufacturing management, financial management and employee information systems. In fact, the customer data base portion of the plan is presently in production. Since all of the systems employ on-line processing to update and retrieve information stored in companywide data bases, it became evident that two lines of security defense were needed. These security defenses should also enforce a proper separation of management duties.

### First Line

The first line of USG's defense, the functional one, is geared to limit the use of a specific CICS transaction to authorized individuals. For example, only Credit Department employees can update credit-related items in the Customer Data Base. This was formerly handled by CICS sign-on.

The second line of defense, the organizational line, is activated when a person passes the first line and access to functional CICS is granted. This roadblock restricts the retrieval and/or update of a particular data base record to the owner of the record.

Owing to USG's experience with the Customer data base system, the firm's first area of concern was CICS sign-on. Its capabilities were quickly exceeded by the increasing security needs of the company.

In the face of future systems, a decision about upgrading the state of security on the network had to be made. This, in addition to an ever-increasing stack of DP audits and DP management awareness of the need to address information security in general, led to the creation of a full-time security analyst position.

The responsiblity for security was put under the direction of the Data Base Group. The Data Base Group had helped in the development of on-line safeguards used in the Customer data base and other systems and is involved in nearly every phase of the systems design life cycle.

### Generalized System

To start, the company theorized that a generalized security system able to embrace all of the components of the on-line network would be exactly what was needed. Such a system would allow centralized control of the security aspects of the network. The system would enable the two lines of defense described, with a minimum of application-level programming, and would not be party to the deficiencies of CICS sign-on security. The main reason for building or obtaining such a system would be to alleviate the technical security design considerations for the systems designers while ensuring that security safeguards were consistently and dutifully applied in each and every new system. With this as a basis, the following general requirements for a proposed on-line security system were formulated:

- It had to be the global control device for security on the network.
- It had to meet initial sign-on needs (the first line of defense).
- It had to offer protection past the point of sign-on (the second line of defense).
- It had to protect the entire network, both present and future.
- It had to be flexible enough to model the security needs of the organization.
- It had to be easy to use, both from a security administration and user angle.
- It had to be secure itself.

A working committee composed of personnel from the newly titled Data Base and Security Group, DP Audit, Network Systems Support and Systems Programming was then formed. First, USG investigated the idea of creating its own software in-house. It also developed a list of questions for vendors. USG selected Guardian from On-Line Software. Guardian not only met USG's basic requirements, but provided:

- An individual security profile for everyone allowed access to CICS.
- On-line mediation in the form of controlling, monitoring and limiting access to resources based on an indi-

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# Of On-Line Defense—Functional, Organizational

vidual user's security profile, the terminal and the time of day, among other things.

• No trial-and-error penetration from sign-on.

• Automatic shutdown on violations.

• Audit reports showing attempted security violations.

• Selective file inquiry or update based on a user or class of users.

• Dual administration (multiple authorization) for purposes of validity checking.

Guardian underwent in-house testing before being instituted in a three-phase installation program. The first phase involved protecting transactions affecting only local DP personnel.

Next, the local non-DP user base and the remaining user community were added. The idea behind the phased approach was that it allowed USG to maximize the chances of solving problems that may have occured either from a technical or human factor standpoint before affecting all of the users.

All changes to the security scheme, monitoring of the system and general administration of security rests in one area, the Data Base and Security Group. Centralized administration offers a focal point for controlling, gathering, documenting and disseminating information about the state of security of the network.

Administration of the new security system includes:

• The daily monitoring of security violations and operator activity using the console messages and hard-copy reports produced by Guardian. Appropriate action is taken after security violations along with follow-up and documentation.

• The creation of a reporting sytem, which provides USG with timely information pertaining to employee transfers, terminations and new hires. This allows personnel-related changes to be immediately reflected in the security scheme.

• Assignment of user passwords by another area, thus enforcing the "separation of duties" concept.

• Periodic revision of user passwords to minimize loss of confidentiality.

• Maintenance of Guardian auditability by producing audit trails and backup documentation for any revisions made to the security scheme.

*Laasko is the data base and security administrator and Weinberger is a senior systems analyst at USG in Chicago.*

## Users Playing Active Role

*(Continued from SR/37)*

plifying the entire data entry operation.

Data entry clerks now balance their own work, run special reports and output data to magnetic tape, which an NCR Corp. mainframe efficiently accepts. And the combined word/data processing approach automatically produces 200 to 900 maturity notices for certificates per week to depositors.

### Fast-Food Chain

The headquarters of a nationwide fast-food chain is an interesting example of a user that has adapted to advances in computer technology.

The need was to rapidly process payroll for 400 nonfranchised stores. They began by having a telephone operator with a pencil, calculator and headset transcribe hours worked and employee name. These were then transferred to code sheets, then to keypunch and finally to data entry.

This procedure was subsequently replaced with dual centralized data entry systems, and then a modem for entry directly into the computer.

Next was the installation of data entry devices in 13 regional offices to distribute the work load. Clerks performed batch checking and transmitted data in batch mode to the host computer at headquarters.

Finally, remote job entry — or distributed data entry — was displaced by true DDP at regional locations. This was accomplished by incorporating remote file processing capability at each regional center. Now only summary transactions are transmitted to the main computer.

Has DDP reached the end of the road? Not by a long shot. The full potential of DDP is just beginning to be realized. Great strides have been made in the area of distributed networks and value-added networks. The '80s will see more and more use made of these national and international networks.

*Brown is the southern regional director for Nixdorf Computer Corp.*

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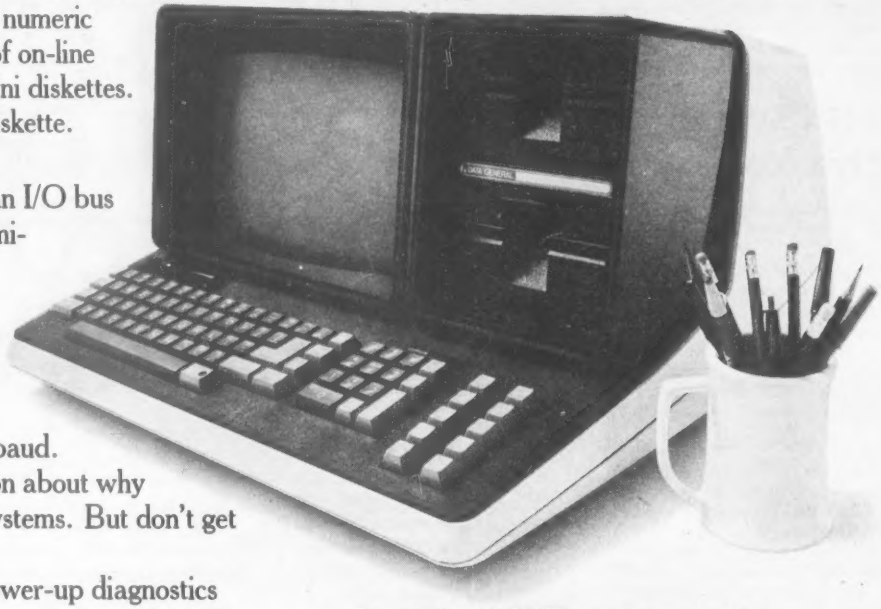

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*Handles Static, Dynamic Data Differently*

# Hotel Chain Checks In New Data Scheme

By Brad Schultz
CW Staff

SILVER SPRINGS, Md. — Rising communications rates led the man directing development of what may be the world's most sophisticated hotel reservations network to centralize his organization's static data and disperse banks of dynamic data to the computer rooms of branch hotels.

As information systems vice-president for Quality Inns International, Inc., Ray Z. Franks wants relatively static data in the "five or six gigabyte" capacity of 18 IBM 3350 and four 3330 disk drives that two IBM 4331-II mainframes run at the company's headquarters here.

Static data — information that seldom changes — on the number and nature of rooms at a particularl hotel, the range of local guest attractions and the price structure for accommodations is accessed less frequently than dynamic data, Franks figured.

That means dynamic data — changing information such as the identities of guests, corresponding travel arrangements and hotel occupancy levels — costs more to communicate. He wants dynamic data on the IBM Series/1 at each Quality Inn, where it does not have to travel far to reach DP operators at IBM 3101 CRT terminals in the same building.

In this way, Franks intends to decentralize 75% of Quality Inn's data communications dedicated to hotel reservations. As price/performance ratios for systems hardware drops, he told *Computerworld*, and carrier tariffs rise, it makes sense to put more processing power in the field, reducing the need for communications between geographically dispersed Quality Inns and the Silver Springs corporate headquarters.

*The Quality Inns project must deal with a deregulated marketplace . . . 'You can no longer just throw a line in wherever you want new capabilities,' Franks noted.*

Two 3705 processors will front end the dual 4331-II configuration, which may drive 2,000 software programs by the time Franks has the proposed reservations system operational. There, processing will adhere strictly to the Synchronous Data Link Control (SDLC) protocol of IBM's Systems Network Architecture, he said.

### 'Starburst' Objectives

Already the world's seventh largest hotel chain, Quality Inns expects to double its size in the next three years. To support this growth, Franks plans to give system operators a 3-sec response time at their 3101s.

The data will pass as fast as 1,200 bit/sec through a system that is 99% available around the clock, seven days a week — if the system dubbed "Starburst" meets Franks' objectives.

To build Starburst, Franks decided to assemble a small staff of highly paid programmers and analysts. He used 43 people to build the $23 million Holidex II reservations system for Holiday Inns, but next used only 13 people to build the $15 million Star system for Best Western International.

Cutover to Starburst is scheduled for Jan. 2, 1982. In the year after that, Franks plans to prepare a second host systems site in Phoenix and may add a third site "somewhere in the Midwest" by 1985.

Quality Inns may decide to sell Starburst's design to other hotel chains that are not considered competitive, Franks noted. By that time, the 40 message/sec reservations system should be in a class by itself, he declared.

In contrast to the conditions under which Holidex II and Star were built, the Quality Inns project must deal with a deregulated telecommunications marketplace, where "you can no longer just throw a line in wherever you want new capabilities," Franks noted.

# CDC Offers Terminals Oriented to Operators

MINNEAPOLIS — Control Data Corp. has announced the first of a family of operator-oriented computer terminals said to be compatible with all CDC computing systems that support teletypewriter-compatible, asynchronous terminals.

The CDC 722 Display Terminal is a microprocessor-controlled, asynchronous terminal for both local and remote data processing and features silent operation.

The unit features a 1,920-char. display, transmission speeds of 110- to 19.2K bit/sec, an 85-key keyboard including a numeric pad and 12 special-function keys and N-key rollover circuits to prevent loss of input data.

Users of the terminal can attach either the Control Data 753-11 Nonimpact Printer.or the 755-21 Impact Printer. The terminal may be purchased for $1,375 plus installation, or leased for one year at $55/mo or for three years at $50/mo from Box 0, Minneapolis, Minn. 55440.

# TI CRTs Have Ergonomic Features

DALLAS — The first model in a new family of CRT terminals has been introduced by Texas Instruments, Inc. and is said to offer state-of-the-art ergonomic features.

The Model 940, which reportedly offers advanced editing capabilities, also has 16 operator-programmable function keys, up to 12 independent scrolling regions, 80- and 132-column display formats and character verification.

For applications requiring additional user-oriented features, the firm is offering optionally one or three additional pages of memory, a tiltable display, operator-changeable display filters and graphic character sets.

The unit's screen can be divided into as many as 12 independent scrolling regions with two vertical segments and up to six horizontal segments, the firm said.

Ergonomic considerations include a detached keyboard connected to the display monitor by a six-foot coiled cord as well as a keyboard with functionally clustered keys in typewriter, numeric, editing and function categories.

The 128-char.-set unit communicates through standard EIA RS-232C interface for asynchronous full- or half-duplex communications. Selectable transmission rates range from 110- to 19,200 bit/sec.

The Model 940 costs $1,895. Details are available through P.O. Box 202145, Dallas, Texas 75220.

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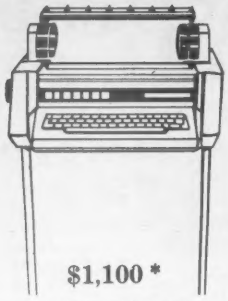

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# 'SRM1' Extends Control, Path Selection for 3270s

ST. PAUL, Minn. — Release 1.0 of NCR Comten, Inc.'s Subarea Routing Manager (SRM1) reportedly provides an extended path selection and control capability beyond that offered by IBM for IBM 3270 CRT terminal devices attached to a Comten 360 front-end processor.

The software runs on IBM 360, 370, 30 series, 4300 or equivalent host processors.

### Access Methods

With Release 1.0, BSC 3270 devices attached to a 3600 can now be shared by multiple host access methods and participate in host-independent cross-domain sessions without acquiring MSNF in the host processor, the vendor claimed.

SRM supports the Comten Data Switching System and Multiple Access Facility and licenses for $120/mo or $1,320 yearly.

The vendor is at 2700 Snelling Ave. N., St. Paul, Minn. 55113.

## Lightweight CRT Tilts, Swivels

MINNEAPOLIS — The Teleray Division of Research Inc. has introduced a 12-in. CRT display which weighs 18.5 lb and may be tilted and swiveled to achieve optimum viewing angle.

The L-style is available on Teleray models 10 and 100. Model 10L is a smart single-page editor and the 100L model is a 132-column, VT100-compatible unit with advanced video, and bidirectional peripheral port. Both have user-programmable function memory and are completely modular.

The Model 10L lists at $1,150, the 100L costs $1,750 and the optional wall bracket is available for $40. Quantity discounts are available and delivery will take 6 to 8 weeks. The vendor may be reached through Box 24064, Minneapolis, Minn. 55424.

## Full-Duplex Modem Bell 212A-Compatible

NEW BRIGHTON, Minn. — Multi-Tech Systems, Inc. has announced a Bell 212A-compatible modem that operates in a full-duplex mode over dial-up lines.

The MT212A offers both 1,200 bit/-sec and 0- to 300 bit/sec transfer rates with asynchronous or synchronous operation selectable in the 1,200 bits/-sec mode, the vendor said.

The unit costs $850, with quantity discounts available, the vendor said from 82 Second Ave. S.E., New Brighton, Minn. 55112.

## Rixon Expands DCX Mux Line

SILVER SPRING, Md. — Rixon, Inc. has added two models to its Data Concentration Exchange (DCX) line of statistical multiplexers, both of which are said to be compatible with the company's DCX815 and DCX850 multiplexers.

The DCX836 is a point-to-point multiplexer offering up to 60 asynchronous channels over a single composite link, the vendor spokesman claimed.

The DCX840 network multiplexer offers the same transmission characteristics but of up to 240 asynchronous channels over as many as 12 composite links, allowing for centralized control and extensive fault isolation routines, the vendor said.

The prices of the DCX836 and DCX840 depend on the user's equipment configuration and are available from stock from Rixon, Inc., 2120 Industrial Pkwy., Silver Spring, Md. 20904.


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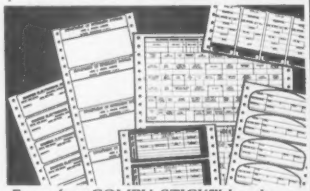

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# Sigma Offers Buffered Interface Between PDP-11s and Terminals

ANAHEIM HILLS, Calif. — A buffered, program-controlled interface between a Digital Equipment Corp. PDP-11 and multiple local or remote asynchronous terminals has been introduced by Sigma Sales, Inc.

SCD-DZ11 is available in 8-line or 16-line EIA or 20mA versions. A mixed line version, which provides 8 lines each of EIA and 20mA operation in a single multiplexer, is also available. All SCD-DZ11s are software compatible with DEC operating systems and diagnostics designed for DZ11.

The 8-line versions consist of a single hex-wide control board, cable assembly and distribution panel. They can be expanded to 16 lines by adding a second control board and cable assembly.

The 16-line versions consist of two hex-wide control boards and cable assemblies with a distribution panel.

### EIA Versions

The EIA versions were designed for local or remote public line and remote private-line operation. The 20mA versions do not support data set control and are active only.

Programmable speeds up to 9,600 bit/sec and format on a per line basis are possible.

The 8-line version costs $1,615, the 16-line version costs $2,733, the mixed-line version costs $2,733 and the 8- to 16-line expansion version costs $1,360 from Sigma at 6505 Serrano, Anaheim Hills, Calif. 92807.

## Victor Printer Offers 80 Col, Four Interfaces

CHICAGO — A heavy-duty, 80-column, bidirectional printer, which reportedly meets such specifications as software on and off control, status feedback signals and a busy signal should its buffer become filled, is available from Victor Data Products.

The Model 5080 printing terminal allows the user to choose one of the following four interfaces to print uppercase and lowercase Ascii characters at a 100-char./sec throughput of 480 dot columns per line, the vendor spokesman claimed; 8-bit parallel, RS-232, TTY and IEEE-488.

The price for the unit is $995, the vendor said from 3900 N. Rockwell St., Chicago, Ill. 60618.

## Board Allows Multibus Hookup

CHAMPAIGN, Ill. — A serial interface board that allows up to eight EIA RS-232 interfaces to be hooked to any Multibus system is being offered by Central Data Corp.

The Intelligent Octal I/O board allows full 16-bit dipswitch addressing and straps select a range of interrupt capabilities.

Each interface is controlled by a Signetics Corp. 2651 Usart, which has an on-chip bit/sec rate generator that enables the user to set each Usart at a different speed. Available rates range from 50- to 19K bit/sec, the vendor said.

The board costs $920 from Central Data at 713 Edgebrook Drive, Champaign, Ill. 61820.

## *Fiber-Optics Guide Out*

BROOKLINE, Mass. — The 1980-81 edition of the "Fiber-Optics Handbook and Buyers' Guide" is now available from Information Gatekeepers, Inc.

The third annual edition of the handbook contains a worldwide listing of fiber-optic manufacturers and suppliers, as well as state-of-the-art articles and an extensive listing of sources of information.

Feature articles discuss topics ranging from basic optical fiber technology to design information about the latest methods of fiber manufacture and the relevance of the latest semiconductor technology on optical communication networks.

The handbook costs $30 ($35 outside U.S. and Canada) until March 31. Payment must accompany orders to take advantage of this price. Information Gatekeepers is at 167 Corey Road, Brookline, Mass. 02146.

## HP Transmitter Prices Cut

PALO ALTO, Calif. — Hewlett-Packard Co. has reduced quantity prices on its fiber-optic HFBR-1001 and HFBR-1002 transmitters and the HFBR-2001 receiver by 33% to 35%.

In quantities of one to nine, the HFBR-1001 costs $150, the HFBR-1002 costs $225 and the HFBR-2001, $150, the vendor said from 1501 Page Mill Road, Palo Alto, Calif. 94304.

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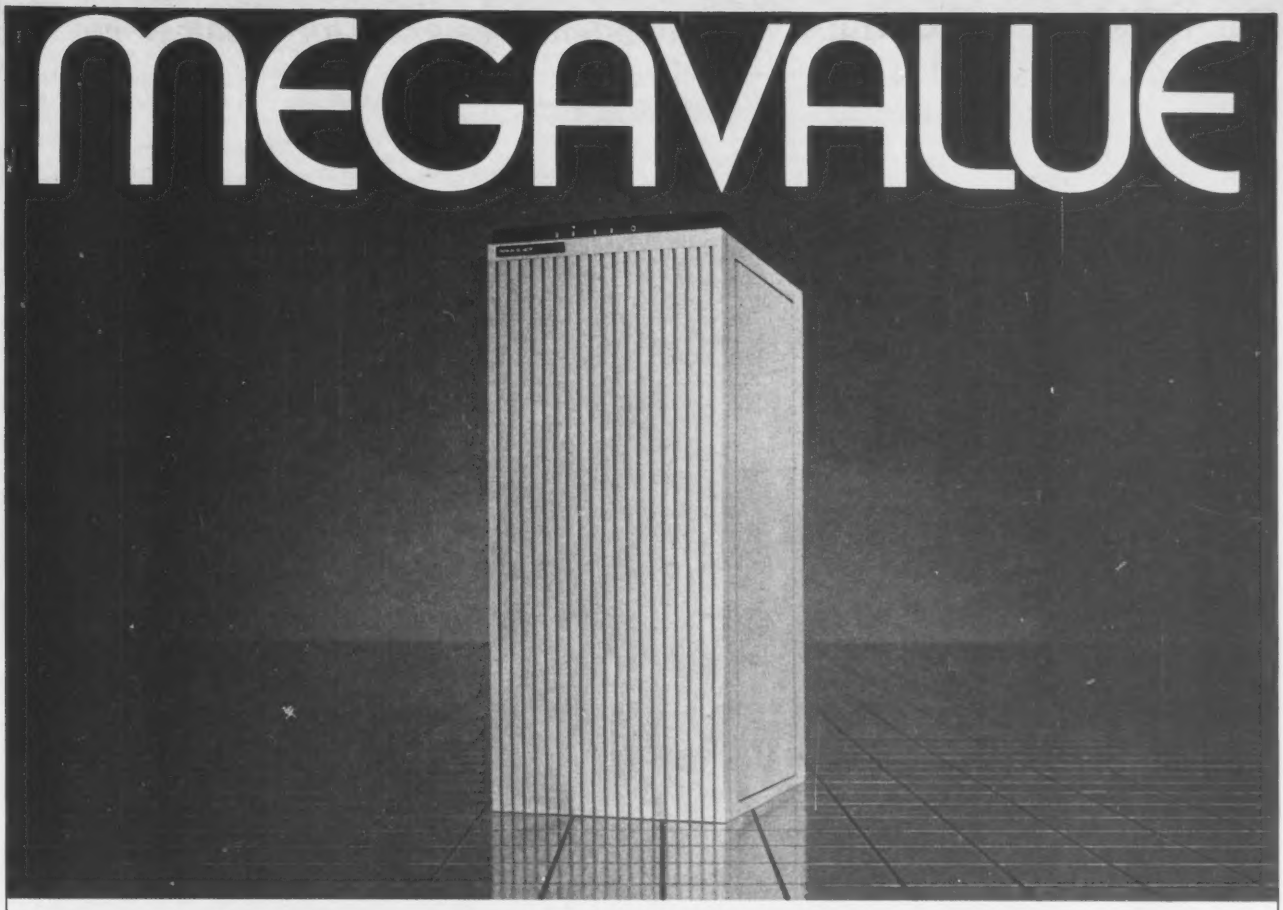

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# Dual-Diskette MSU Traps, Records, Plays Back Data

HORSHAM, Pa. — The Digilog Network Control Division of Digi-Log Systems, Inc. is offering a dual-diskette mass storage unit (MSU) which reportedly can be used to trap, record and play back over 400K bytes of communications data and control sequences.

The MSU III can be used for fault analysis, network testing and operating training and serves as a companion unit to the Digilog DLM III data line monitor, a spokesman said.

When used with the DLM III, the product provides unattended monitoring of full duplex communications data at line speeds up to 19K bit/sec and access of communications sequences the operator wants to analyze at his own pace, the vendor claimed.

The product costs $3,575 from the vendor at Babylon Road, Horsham, Pa. 19044.

## Test Set Shows DTMF Combos

OAKLAND, Calif. — A pocket calculator-sized dual-tone multifrequency (DTMF) test set with an eight-digit display that reportedly shows all 16 DTMF combinations is available from Conway Engineering.

The DTMF-5000 decodes up to 20 char./sec and includes a rechargeable battery, carrying case, patchcords, earphone and charger.

It costs $329. The vendor can be reached through P.O. Box 6073, Oakland, Calif. 94603.

# *Modem Designed for Small Users*

DANBURY, Conn. — A 300 bit/sec under-the-phone modem aimed at the small business and home computer user has been developed by General Datacomm Industries, Inc.

The 103J-L operates over all dial telephone lines. A switch selects data or talk modes and a Data Flow and Carrier Detect indicates transmit and receive data activity and whether the call is established with another modem.

Answer and originate mode automatically is selected and shown on an indicator, the vendor explained.

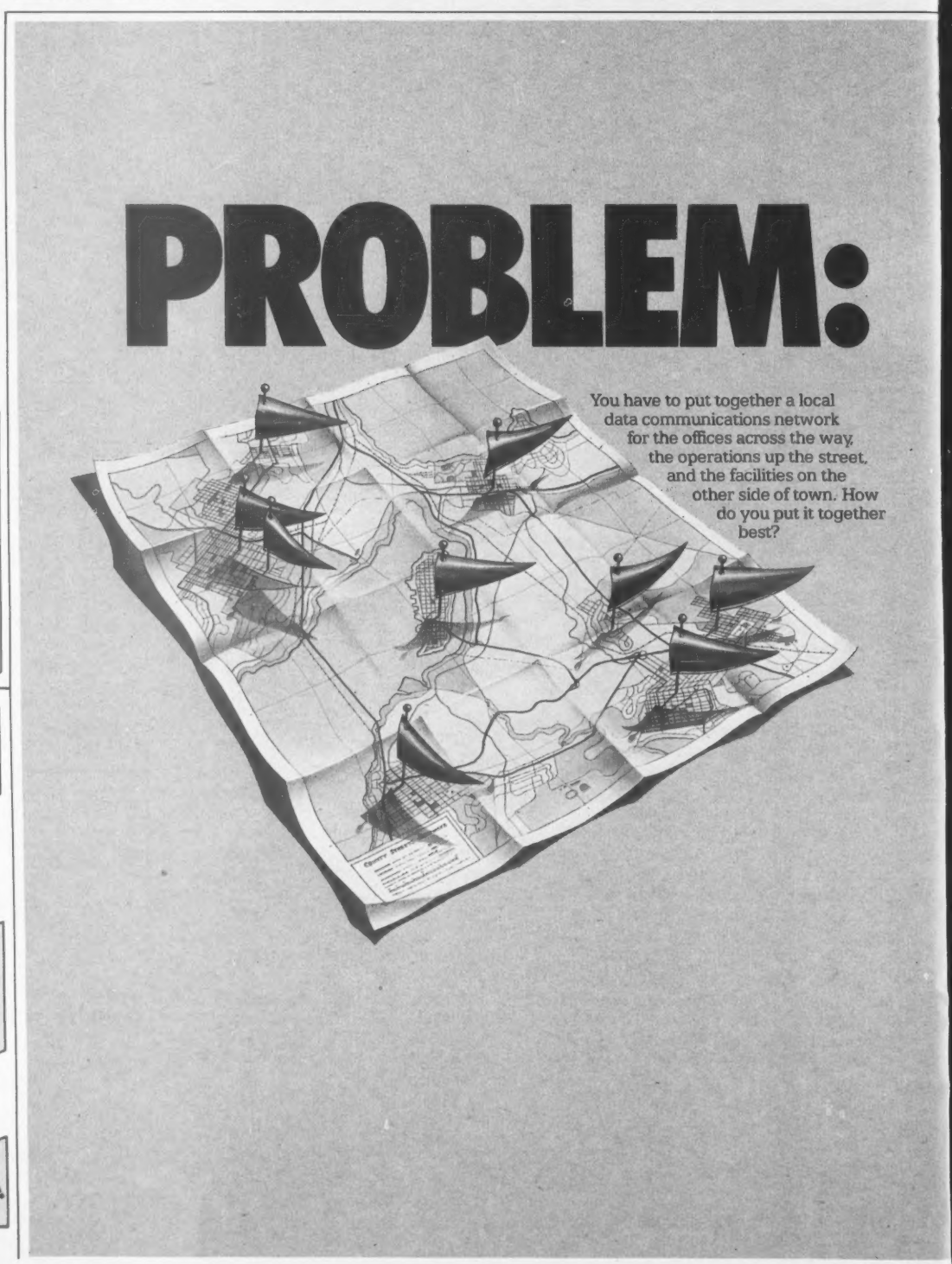
The 103J-L features self-diagnostics which loops data from the terminal through the modem to check operation.

**Modem Installation**

The modem can be installed by connecting the modular plug from the phone to a jack in its rear panel. Business equipment connects to the 103J-L with an EIA 25-pin RS-232C connector.

The price of the 103J-L is $199.

Quantity discounts are available, the vendor said from One Kennedy Ave., Danbury, Conn. 06810.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## Amdax Modem Suited To High-Speed Use

BOHEMIA, N.Y. — A modem reportedly suited to synchronous high-speed computer-to-computer, controller or multiplexer data exchange applications has been announced by Amdax Corp.

The DAX-1140 is an adjunct to the IBM 3274 control unit and is capable of supporting data transmission speeds up to 56K bit/sec, the vendor spokesman said.

The modem also features initialization controls, point-to-point or multidropped connections and built-in diagnostics and status indicators, the vendor claimed.

The DAX-1140 is priced at $1,800 and is available immediately.

Amdax Corp. is located at 160 Wilbur Place, Bohemia, N.Y. 11716.

### For Wang, DG, PE Users

## Options Out for Micro800, 900

CHATSWORTH, Calif. — Micom Systems, Inc. has announced three options for its Micro800 data concentrator and Micro900 multidrop concentrators.

The options are said to make the packages more attractive to Wang Laboratories, Inc., Data General Corp. and Perkin-Elmer Corp. (PE) users.

The Wang option allows the Micom packages to be used on Wang 2200 processors and word processing systems that transmit 9-bit information fields, the vendor said.

The Data General option provides enhanced flow control that suspends data transmission when a clear-to-send command is dropped, Micom said.

The Perkin-Elmer option offers the same capabilities as Perkin-Elmer Interdata processors. However, it eliminates the need for separate control characters to suspend and resume transmission, the vendor said.

The Micom additions are no-charge options and the firm's packages cost between $1,200 and $1,600, the vendor said from 9551 Irondale Ave., Chatsworth, Calif. 91311.

## Gear Handles Speech, Data At 1,200 Bit/Sec

BOONTON, N.J. — RFL Industries is offering a speech/-data processor that reportedly provides simultaneous quality voice and 1,200 bit/sec transmission over a four-wire line.

The Model 6860 affords a voice and data link between remote video display terminals, as may be found in a district or subsidiary office, and a CPU. The voice conversion may be conducted point-to-point or PABX-to-PABX, the vendor claimed.

The unit costs $3,264, the vendor said from Powerville Road, Boonton, N.J. 07005.

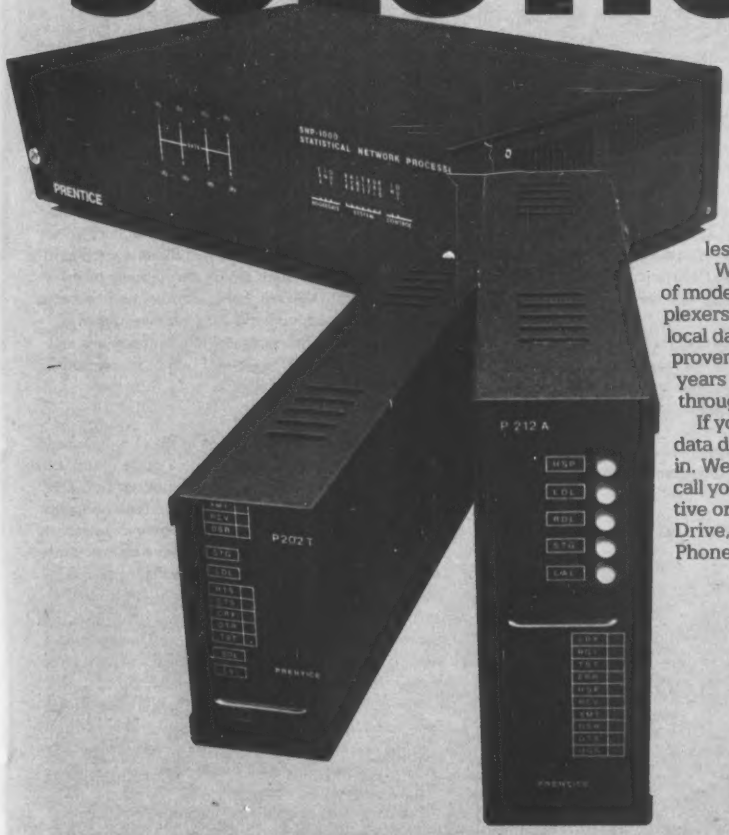
## Computer List Offered Free

TARZANA, Calif. — A list of more than 100 computers in schools, publishing houses and commercial businesses that can be accessed free is available from Novation, Inc.

The list covers 29 states and the District of Columbia and covers such subjects as astronomy, education and amateur radio, the vendor said.

The list can be obtained from Novation at 18664 Oxnard St., Tarzana, Calif. 91356.

SOLUTION:

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# Multiple Systems Users

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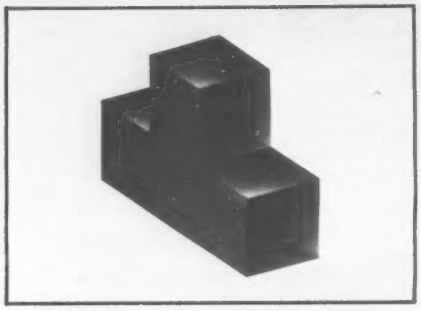

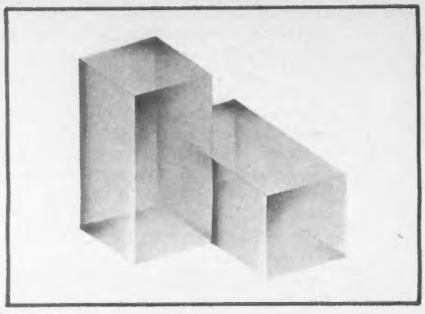

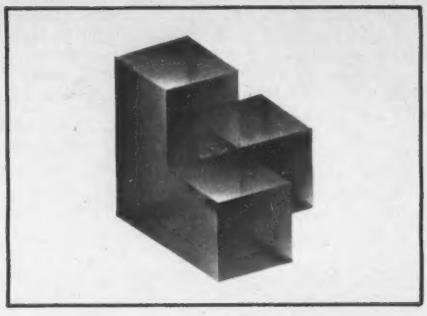

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MSM eliminates the operational burden of juggling TAPE and DISK units among systems. It protects against the danger of a system accidently rewinding or overwriting a TAPE in use on another system; this removes the single greatest cause of shared tape mishaps.

MSM will use your TAPEs and DISKs more efficiently—which can result in immediate device cutbacks or (more likely) postponement of future acquisitions.

MSM is so transparent that it can be operated without the use of any new operational commands. Of course, there are powerful new commands available—however these are extras, not necessities.

Only MSM allows such truly NATURAL and transparent shared device management.

Other features (for MVS environments only): The MSM Device Preferencing capability allows devices to be dynamically structured into a hierarchy of sets; MSM insures that units in preferred sets are used, whereever possible, before less preferred sets.

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### TRANSPARENT SINGLE SYSTEM IMAGE

Allen Services' line of software packages for Multiple System environments, allows an entire complex of systems to be treated almost as though it were one single unified system. The complete "unified system" effect is achieved through combined use of three independent (but related) program products. Each of these, Super-MSI, MSM and GCD addresses distinct concerns present in multi-system environments.

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The Global Console Director is an extremely flexible tool. It allows (selected) message streams from different systems to be logically "blended" to create a unified system image (to whatever degree desired). In a slightly different vein, GCD allows any console on any system to be logically attached concurrently (and perhaps in different ways) to any set of systems in your complex! GCD allows commands entered from any console to be directed and processed anywhere in the complex; in this respect, all consoles are effectively linked to all systems. In almost every aspect, GCD is philosophically and operationally compatible with the standard system console support.

GCD can improve overall throughput by simplifying operations. By allowing several physical consoles to be logically merged, excess devices can be eliminated for immediate savings, or deployed elsewhere to strategic advantage.

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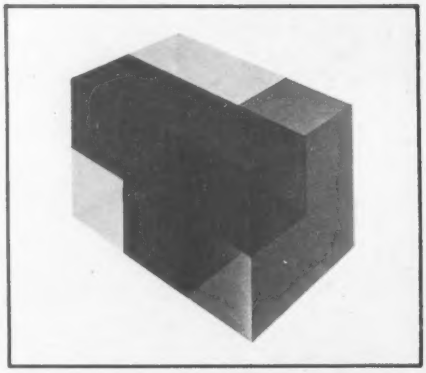


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Another feature: Super-MSI also eliminates the hardware RESERVE lockouts which are normally inherent with SHARED DASD in multiple system environments.

Much more besides: Super-MSI has many other exciting features including special aids for operators and TSO Users. All in all, Super-MSI will be a very powerful addition to your installation.

If you wish to use more than one of the above products, they can be integrated together into a single control task (thus further reducing overhead complexity). In nearly every instance where our products have been competitively evaluated against all possible hardware or software alternatives—our software has been chosen. Aside from IBM, Allen Services has been providing commercial software specifically designed for multiple system environments longer than any other company. Over 500 major installations throughout the world have already selected our products as the preferable means of handling problems associated with multiple system environments. The number grows daily. Reliability has always been an integral part of our design.

When considering software, most people consider support to be a very important factor-Allen Services has over 200 support personnel.

The only other comprehensive approach to unifying multiple systems is JES3 (or ASP). Aside from the fact that MSI/MSM/GCD can be installed and implemented in only a few minutes, there are several other significant differences from JES3: For example, MSI/MSM/GCD (combined) use only 1% to 2% overhead; MSI/MSM/GCD are invisible to your users; MSI/MSM/GCD were designed to be strictly compatible with OS/VS/MVS philosophies—in this regard none of your personnel will require re-training. The majority of all eligible multiple system insallations are now using our products to help manage their systems.

# *Users Pleased With Winchesters: Datapro*

DELRAN, N.J. — Nearly every current user of fixed-head Winchester disk drives is fully satisfied with the performance, ease of operation and reliability of their systems, according to a recent survey conducted by Datapro Research Corp.

In fact, almost half of the users surveyed intend to buy additional Winchester drives this year from the same vendor.

Late last year, Datapro asked 47 Winchester users — all of them subscribers to the firm's research service — if they were happy with the disk drives installed at their sites. The respondents represented a total of 650 Winchester drives. All but two of the users had the large 14-in. disk models, and 15 users had more than one vendor's model.

Five vendors were included in the survey: Control Data Corp., Data General Corp., IBM, Memorex Corp. and Shugart Associates, Inc. Most of the users claimed having IBM disk models, followed far behind by Memorex.

On a scale of one to four, with four the highest, users rated ease of performance with a 3.9 as the drives' greatest attribute. Overall performance and equipment reli-

*(Continued on Page 64)*

**USERS' RATINGS OF WINCHESTER DISK DRIVES**

| | Excellent | Good | Fair | Poor | Weighted Average* |
|---|---|---|---|---|---|
| **Overall Performance** | 43 | 15 | 3 | 0 | 3.7 |
| **Ease of Operation** | 52 | 9 | 0 | 0 | 3.9 |
| **Equipment Reliability** | 43 | 17 | 1 | 0 | 3.7 |
| **Maintenance** | | | | | |
| **Promptness** | 39 | 15 | 2 | 3 | 3.5 |
| **Effectiveness** | 37 | 17 | 4 | 1 | 3.5 |

*Weighted on a scale of 4.0 for excellent to 1.0 for poor.

Source: Datapro

## *Controller, Terminals Added*

# Diskless PTS/1200 Joins Raytheon Line

NORWOOD, Mass. — Raytheon Data Systems Co. has boosted its PTS/1200 distributed data processing (DDP) family by introducing a diskless version of the previous machine members.

The PTS/1210 operates without the requirement for disk access and storage and can be used as an entry-level distributed processing system, a multiprotocol communications controller or a remote batch terminal.

At the same time, the firm also unveiled a medium cluster controller and three redesigned terminals for its PTS-100 systems line.

Unfortunately, for bottom-line enthusiasts, prices for the systems and system additions were not available at press time.

The PTS/1210 is available in five different communications modes: 3270, Hasp, Dual 3270 Upline, 3270 and Hasp, and Dual 3270 Upline and Hasp.

With Hasp support alone, the 1210 functions as a remote batch terminal for on-line entry and print applications. And with the addition of 3270 support, the same system can operate concurrently as both a batch and interactive terminal. However, Dual 3270 Upline allows any one of up to 24 CRT terminals to access 1210 host machines using IBM 3270 Bisync protocol.

### User-Written Programs

The 1210 can take advantage of user-written programs that allow editing, preprocessing and verification functions, a spokesman explained. Additional peripherals include letter-quality, matrix and line printers along with a 300 card/min card reader.

For those who seek full-throttle distributed processing, the 1210 can be field upgraded with additional disk storage, the spokesman noted.

The Model 1009 medium cluster controller can support a system configuration of up to 20 devices, consisting of 16 CRTs and four printers. The device serves as a cost-effective replacement for a variety of terminal systems communicating with a host computer under 2260, 3271, 3274 BSC, 3274 SDLC and Pars/Ipars protocols and was designed for limited-space airport and office environments.

The 1009 supports all existing PTS-100 system standard remote emulators and includes 32K or 64K bytes of memory. It also communicates with a host computer via a modem at line speeds of up to 9,600 bit/sec, the spokesman noted.

Finally, Raytheon announced a series of 9-in. CRT terminals and redesigned keyboards for its PTS-100 that are geared for ease-of-use.

The models 4205, 4206 and 4207 terminals were designed to fit into small areas and are alternatives to the larger 15-in. models 4103 and 4104. The 4205 and 4207 are master terminals capable of supporting a Model 4206 slave display at distances up to 200 ft. The master terminal

*(Continued on Page 64)*

# Tandem Cuts Memory Prices

CUPERTINO, Calif. — Tandem Computers, Inc. has slashed the price of its 384K-byte memory boards by 25% to $9,600. The boards are used in the vendor's Nonstop computer systems.

The company cited the cost decrease in 16K random-access memory semiconductor chips as the reason for the change.

The company also announced it will immediately increase the price of processor units included in the basic nonstop system and in processor upgrade modules. The effect of the price changes will be a net decrease in the price of any system or processor upgrade ordered with three or more memory modules per processor, a spokesman claimed.

For instance, a typical two-processor Nonstop system with 1.5M bytes of memory per processor will show a net price or decrease of about 4%, he said, from 19333 Vallco Parkway, Cupertino, Calif. 95014.

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# Bits & Pieces

## Color Coding Offered As Turnkey or Software

LOS ALTOS, Calif. — A computer-generated color coding system available either as a complete turnkey system with desktop computer and printer or as ready-to-run software for use with existing hardware is available from Wenner Business Systems.

Compu-Key can produce random number or custom color-coded labels and can create machine-readable bar codes, special alpha or numeric prefixes and percentage graphs for noncolor file control, the vendor claimed.

### Basic Label

The basic Compu-Key label is priced at $44 per thousand labels, with processing of the labels and envelopes from diskette at an additional $30 per thousand, and $40 per thousand from hand or typewritten lists.

Wenner Business Systems is located at 170 State St., P.O. Box 831, Los Altos, Calif. 94022.

## Matrix Printer Applications Include CRT Slave Copy

WOODLAND HILLS, Calif. — A matrix printer with applications for CRT slave copy, remote terminal networks and small to mid-range systems is available from PMS Corp.

The DS180 Package Plus performs bi-directional, logic-seeking printing at 180 char./sec which yields throughput of over 200 line/min on average text, the vendor claimed.

The adjustable head can print six-part forms which can be fed through the front and from the bottom with the floor printer stand, PMS said.

The DS180 Package Plus printer including a floor stand is priced at $1,595, with quantity discounts available from PMS Corp., 6319-B DeSoto Ave., Woodland Hills, Calif. 91367.

## Processor Converts Speech To Digital Bit Stream

ACTON, Mass. — Mimic Electronics Co. has announced a speech processor that converts speech signals to a digital bit stream for processor storage or automatic speech recognition purposes.

Called Mimic, the unit reconstructs digital speech representations to analog form for reproduction through a speaker.

Functions are located in a single unit and the unit can be used for speech communications without a processor, the vendor said.

Prices for an assembled module range from $79 to $169.

Mimic Electronics may be reached through P.O. Box 921, Acton, Mass. 01720.

## Graphics Terminal Runs With Tektronix Plot-10

BEDFORD, Mass. — A graphics terminal that is software-compatible with the Tektronix, Inc. Plot-10 reportedly provides 11 operating modes and three user-programmable modes is available from Continental Resources, Inc.

The CPG-100 operates in 11 modes to permit use for graphics memory, alphanumerics or independent use of either, without affecting the other, the vendor claimed.

The model is also compatible with Integrated Software Systems Corp.'s Dissplа and Tellagraf. The terminal costs $3,195 from Continental Resources, 175 Middlesex Tnpk., Bedford, Mass. 01730.

# Winchester Users Reportedly Pleased

(Continued from Page 63)

ability followed almost neck-and-neck with a 3.7 score, the survey showed. Promptness and effectiveness of maintenance, the final two categories, both received a 3.5 rating.

Ten vendor products, however, were rated fair in all five categories in the survey, while four were deemed poor for prompt and effective maintenance. But since IBM was the only vendor whose Winchesters received enough responses for a meaningful ratings conclusion, Datapro did not state in the report which particular drive was the most favored. Instead, the totals for all drives were rated, the report said.

### Removable Backup

As part of the questionnaire survey, users were asked to indicate the type of removable backup utilized with their Winchester disk systems. According to the survey, more than 80% of the disk systems are backed by magnetic tape. The remaining approximately 13% and 7% are backed by floppy and hard disks, respectively. A small percentage of the respondents used both magnetic tape and floppy disk backup, the report said.

Besides the survey results, the Datapro report, "All About Winchester Disk Drives," also contains background material on the specifications of Winchester disks, as well as information on the market and future technological advances.

A complete listing of 51 Winchester disk vendors is also included, noting such details as capacities, speeds and pricing.

The report costs $15 from Datapro at 1805 Underwood Blvd., Delran, N.J. 08075.

# Raytheon Adds To PTS/1200s

(Continued from Page 63)

is attached to a PTS-100 processor by up to 5,000 feet of coaxial cable, the spokesman added.

Without the slave terminal, the 4205 and 4207 display formats of 1,920, 1,024 or 960 characters; however, when the slave is attached, only the last two formats can be produced.

The redesigned keyboards include the models 6201 through 6208, which feature new housings.

Raytheon Data Systems Co. is located at 1415 Boston-Providence Tnpk., Norwood, Mass. 02062.


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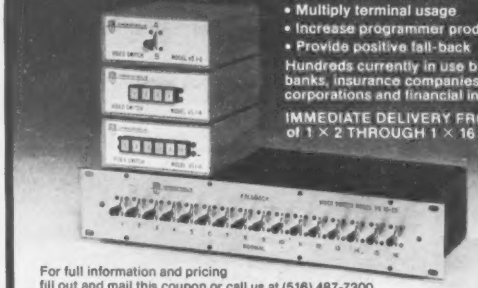

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## *Package Designed To Relieve Overworked PDPs*

GAITHERSBURG, Md. — A hardware and software package said to relieve overworked Digital Equipment Corp. PDP-11s has been developed by Plessey Microsystems, Inc.

Miproc-16 AP offers associate processing that off-loads preprocessing, postprocessing and I/O handling, according to a company spokesman. It works as a separate computer system operating on a direct memory access arrangement with any Unibus or Q-bus PDP-11.

A software handler links the PDP-11 and Miproc-16 AP, reportedly providing a way to shift programs and data on a DMA link.

### Pascal Compiler

Software for the associate processor is developed on the host PDP-11 using a Pascal compiler that has the ability to produce both Miproc-16 AP programs and PDP-11 programs.

The unit features four million instructions per second with 177 instructions available. Interrupt handling of 750 nsec with three microseconds for complete context switching is said to make the unit an appropriate I/O handler for front-ending PDP-11s.

Offering DMA transfer rates up to 20 Mword/sec, the unit will operate in conjunction with RT-11, RSX-11M, IAS and VAS on any DEC computer from PDP-11/03 to VAX 11/780.

Prices start at $18,500, including development software from the firm at 19546 Clubhouse Road, Gaithersburg, Md. 20760.

## Mini-Based Net Offered for Banks

MANCHESTER, N.H. — Planning Research Corp's. Commercial Products Group is offering Optima 300, a minicomputer-based departmental data network system intended for thrift institutions and commercial banks.

The multifunctioned system organizes and maintains all departmental information in a system-managed data base so that information can be distributed to all departments from one central location, according to the vendor.

Optima 300 programs were designed to function in cooperation with existing in-house DP equipment as well as with service bureaus, the vendor said.

Departmental files and programs can be changed without affecting other data, the firm said.

### Software Packages

The entire Optima package consists of software packages, including customer information, new accounts, word processing, credit history, consumer loan, safe-deposit recording, payroll deduction, collection, human resources, financial accounting and mortgage control.

Optima 300's standard configuration includes a Digital Equipment Corp.'s Datasystem 358; 256K bytes of main memory; dual disk drives with a combined storage of 56M bytes; two VT 100 CRT terminals; LA180 line printer; operating system; and three software packages, including customer information, credit history and loan control.

The turnkey system costs $80,000 and includes installation, on-site training and a 90 day warranty.

Commercial Products Group is located at Three Perimeter Road, Manchester, N.H. 03103.

# Remote Micros in Briefcases Make Rounds With Pepsi Crew

Special to CW

TUPELO, Miss. — While Pepsi Cola Bottling Co.'s delivery crew here does not carry the firm's product door-to-door in a suitcase, it does keep track of deliveries through distributed computers in briefcases.

The company's 30 drivers use Norand Corp. Route-Commander microcomputers to collect billing and accounts information from each delivery location and to follow each truck's particular daily inventory flow. At the end of each day, the microcomputers are either plugged directly into the firm's central computer system, or communicate with the computer on a regular basis via dial-up telephone.

Used as remote processors, the Route-Commanders not only adjust remaining inventory on each driver's truck, but also adjust for bottle returns, if any, and track cash and charge sales, Everett Kinsey, vice-president and general manager, said.

The Pepsi Cola Bottling Co. of Tupelo covers 12 counties in northeastern Mississippi, an area roughly 110 miles by 75 miles. The firm sells about two million hard cases of soft drinks per year.

### 'Scared to Death'

When the company initially switched from a manual system to the suitcase computers, the drivers were "scared to death," Kinsey said. However, the firm's management approached the matter with a solid plan. "First, we familiarized ourselves with the operation of the Route-Commanders so that we were completely acquainted with them. Then, we wrote a 'what-if' training manual that discussed every possible thing that could happen and a solution. We were originally planning to take five drivers a week and train them. But it moved so fast that we were able to train all 30 drivers in three weeks," Kinsey said.

"In fact, when the drivers who were using the micros began to tell the others about them, some drivers took the devices home at night to work on them on their own time."

Training on the portable system was provided by the Source One Co. of Kalamazoo, Mich., which also sold the computers to Kinsey's firm.

The route salesperson at the company thinks of himself as more than a truck driver, Kinsey explained, and he readily understands that he now has a tool that will help him make more sales and, in a sense, become more of a businessman.

**Route salesman Charles Sidell of the Pepsi Cola Bottling Co. of Tupelo goes over a computerized invoice prepared by the Route-Commander with James Rucker, manager of Jitney Jungle Supermarket in Tupelo, Miss.**

"Our customers like it too. They think that it's much more professional to receive a computerized printout for a receipt, one that is generated right there on their premises, than a handwritten ticket."

In addition, "The driver now returns to the plant with as much as one-third less unsold merchandise than before. This is a result of the cleaner sales tickets our route salespeople now have available to them with the Route-Commander. They can see more quickly what they've sold and haven't sold at the end of each day."

In justifying the cost of 35 Route-Commanders — the company has 30 out on trucks and keeps five backup spares for emergencies — Kinsey explained that it is more than just a matter of dollars and sense, although that is important also.

First, there was the transfer of a clerk to another area; he had previously worked with the drivers to reconcile errors. In addition, the reduction of load-backs was a big saver for the company. Every truck is unloaded completely when it returns to the

*(Continued on Page 66)*

**Stan Adair, warehouse supervisor, checks outgoing inventory with route salesman G.B. Truelove and inputs data into Route-Commander.**

**"We've sold other computers, but Centurion is the only product we carry now."** — Hal DeWitt and Chuck Buchanan *Cincinnati Data Systems*

When Hal and Chuck started as a two-man operation in 1976, they carried not only Centurion products but also those from some of the much larger computer companies. Today, CDS is the largest independent computer dealer in the tri-state area. Why has Centurion emerged as their only product line?

**Service**
*Chuck:* "You don't have to go through layers of people to get an answer."
*Hal:* "There's always someone who can help."

**Software**
*Chuck:* "Nothing can drag a dealer down faster than software problems. Centurion software is very compatible."
*Hal:* "We have about 40 accounting firms on the same basic package."
*Chuck:* "Something else — it's hard to believe — is the SMART software. You can custom tailor a package in 30 minutes."
*Hal:* "We use it for demonstrations."

**Expandability**
*Chuck:* "These systems let you go from floppy to hard disk without any of those horrendous conversion problems."
*Hal:* "A lot of sales dollars are involved with system expansion — you don't get into a corner with Centurion."

**Reliability**
*Hal:* "The systems are so reliable we can offer in-city repair rates up to 100 miles out."

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The schedule for the 1980/81 Series is:

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# Serial, Line Printers Rival IBM System/34, 38 Models

| | IBM | | | PRINTER SYSTEMS | | |
|---|---|---|---|---|---|---|
| | Model No. | Speed | Price | Model No. | Speed | Price |
| Letter Quality Printers | Not Available | | | PSC-50-34 | 47 cps | $ 5,500 |
| Medium Speed | 5256 Model 1 | 40 cps | $ 5,200 | PSC-1602-34 | 160 cps | 5,000* |
| Dot Matrix | 5256 Model 2 | 80 cps | 5,800 | PSC-120-34 | 180 cps | 4,450 |
| Serial Printers | 5256 Model 3 | 120 cps | 6,250 | PSC-200-34 | 340 cps | 6,410 |
| High Speed | 5225 Model 1 | 280 LPM | 11,650 | PSC-300-34 | 320 LPM | 10,700 |
| Line Printers | 5225 Model 2 | 400 LPM | 13,450 | PSC-600-34 | 650 LPM | 13,700 |
| (48 character | 5225 Model 4 | 560 LPM | 16,350 | PSC-900-34 | 1200 LPM | 16,700 |
| Set) | 3262 Model B1 | 650 LPM | 15,430 | PSC-1500-34 | 1500 LPM | 28,700 |

*Includes Forms-Saving Quick Tear Feature

**PCS's Printers vs. IBM's**

GAITHERSBURG, Md. — Printer Systems Corp. (PSC) has introduced a series of serial and line printers designed to compete head-to-head with IBM's System/34 and System/38 models.

The printer family includes a 47 char./sec daisy wheel system that provides letter-quality printing, three medium-speed printers that operate at speeds from 160- to 340 char./sec, and several band and drum printers that can be used for higher speed applications, a spokesman said.

All of the printers contain user-oriented features such as a quick-tear bar, bottom feed and an optional document feeder.

Each of the printers offers higher printing speeds at lower costs than corresponding IBM systems, a PSC spokesman claimed.

Prices for the printers range from $5,500 to $28,700 (see chart). Additional information can be obtained from the firm at Suite 104, One W. Deer Park Road, Gaithersburg, Md. 20760.

# Tape System Fits CA's LSI-2

CHERRY HILL, N.J. — A digital tape system for use with new or existing Computer Automation, Inc. LSI-2 minicomputers has been announced by Telegenix, Inc.

The TDCA-100 loads 4K of words in three seconds and incorporates a 3M-byte, 140-ft DC-100A data cartridge with a capacity of 18K to 4K blocks, the vendor said. The system mounts directly to CA mother board without modification and features panel Light Emitting Diodes that give power, rewind, read, write, ready and error indications, the vendor claimed.

The system comes complete with power supply and interface and is priced at $1,950 with delivery in two to four weeks from Telegenix, Inc., 26 Olney Ave., Cherry Hill, N.J. 08003.

# PDP-11 Users Get Controller

PALO ALTO, Calif. — Minicomputer Technology, Inc. has unveiled a single-board emulating disk controller for Digital Equipment Corp. PDP-11 Unibus users which can reportedly support high-capacity 600M-byte disk drives.

The EDC21 plugs directly into one card slot, replacing the multiple boards required for a comparable DEC controller, the vendor claimed.

The product emulates the DEC RH11 controller interfaced to multiple RM02/03/05 disk drives and runs with unmodified DEC operating systems including current revisions of RSTS/E, RSX-11M and RT-11, a spokesman said.

The price for the product is $4,900, the vendor said from 2470 Embarcadero Way, Palo Alto, Calif. 94303.

# Drivers Deliver With Micros

*(Continued from Page 65)*

plant so that an inventory can be taken, then the truck is reloaded for the next day. With smaller load-backs, the cost of taking such inventories and unloading the trucks, plus elimination of broken bottles normally associated with load-backs, could produce a savings in excess of $25,000 per year, according to Kinsey.

"There is also the positive effect these devices and their time-saving benefits have had on the morale of our route salespeople. Many of them used to dread coming in each day and reconciling. It was time-consuming and often frustrating when they had errors. Now, knowing that they will take only 15 minutes or less to check in, they have a much better attitude about it.

"At first, we thought the drivers could use this extra time in making more sales calls. But in reality, it didn't work this way because we have a very well-defined territory that is already saturated. But the extra time allows our drivers to spend more time at each location. They can arrange their displays better, which in turn means more sales for us," he continued.

At the moment, Kinsey's operation is installing a Burroughs Corp. B 800 computer system that will replace two competitive computers. The new system will reportedly allow Kinsey and his staff to utilize the marketing data made available through the portable computers.

Through this marketing data, the firm's management will be able to get daily sales reports almost immediately after the last driver has checked in rather than waiting 24 hours.

"We can pull all sorts of information from the computer to help with our marketing," the general manager said.

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**When we put one and two together, you get more megabytes-per-buck. Terrific! Ohio Scientific.**

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*"At 3 AM every morning, our Challenger knows it's time to update all the day's accounting records, P & L, General Ledger and Payables. It knows when it's time to file a tax return and make out quarterly reports. It will even check on the phone bill, and complain to the telephone company about any long distance call it doesn't recognize."*

Holly Quarles, President
Commonwealth Capital Corp.
Charlottesville, Virginia

*"My fastener business is growing rapidly. I have over 800 customers utilizing my 15,000 inventory items daily. Keeping track of inventory, orders, and receivables at this volume level could be a nightmare. But it's not, 'cause my Challenger computer works like a dream. Terrific, Ohio Scientific!"*

Richard Nolan, President
Aerospace Nylok Corp.
Hawthorne, New Jersey

*"I'm a fuel oil jobber, and I can't believe how reliable my Challenger has been, with all it has to keep track of. But, it's been doing it for two years now, and that's terrific, Ohio Scientific!"*

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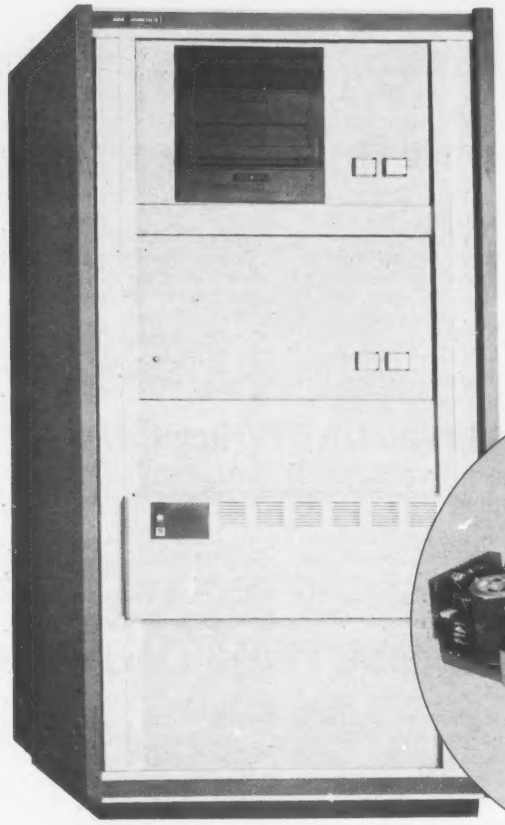

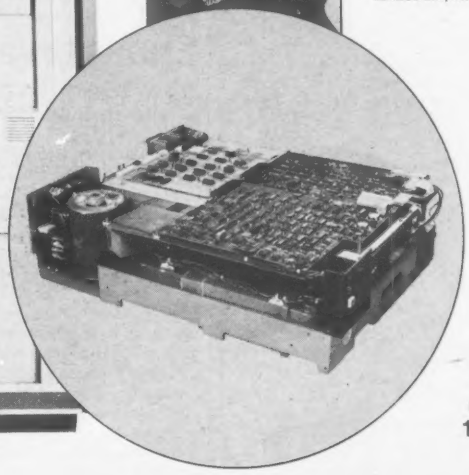

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# 'Practice Manager' Designed For Medical, Dental Uses

NEW YORK — The Practice Manager provides an integrated business and medical package for the dental profession, according to its vendor, Management Perceptions, Inc. (MPI).

A one-time entry at the conclusion of each visit generates a statement written in language the patient understands and an insurance form utilizing proper American Dental Association terminology.

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Upon input of this information, numerous files within the system are automatically updated, such as individual patient treatment records, patient (or family) account profiles, accounts receivable, recall and professional productivity.

The system's word processing capabilities can generate automatic recall notices, dunning letters and referral thank-yous.

A typical turnkey system for a two-practitioner office includes a Data General Corp. 64K CPU, One DG Dasher CRT terminal, a low-speed printer and 10M-byte disk.

The price for the system is approximately $30,000 or $795/mo from Management Perceptions, Inc. at 419 Park Ave., S., New York, N.Y. 10016.

# DEC-Compatible Memory Runs On LSI-11, LSI-11/23, PDP-11/03

SANTA CLARA, Calif. — A 256K-byte memory card reported to be mechanically and electrically compatible with the Digital Equipment Corp. LSI-11, LSI-11/23 and PDP-11/03 microcomputers has been announced by National Semiconductor Corp.

The NS23Q card will operate with or in place of the DEC MSV11-D and MSV11-E series memory cards. It can also be installed in H9270, H9273-A or DDVII-B backplanes or in any quad backplane wired for the LSI-11 "Q" bus, the vendor said.

The card offers a read access time of 180 nsec, a read cycle time of 490 nsec, a write access time of 80 nsec per byte, a write cycle time of 390 nsec and a read/modify/write access time of 700 nsec per byte, the vendor spokesman claimed.

The NS23Q is priced at $1,400 per card for the 128K-byte depopulated version, and $2,250 for the 256K-byte version with a delivery time of 30 days from National Semiconductor, 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

# Solid-State Drum Subsystem Out

ANAHEIM, Calif. — GTE Information Systems has introduced a solid-state drum subsystem which it claims has eight times the capacity of the rotational drum previously used on its IS/1000 16-bit minicomputer system and reduces access time by 98%.

According to GTE, the new drum also reduces power consumption by 50% and costs less to maintain. It is available in single and dual port configurations with up to 16M words of memory.

Features include error checking and correction capabilities.

The price of the drum ranges from $39,000 to $82,000, depending on configurations ordered.

Delivery lead time is six months, GTE Information Systems said from 4940 E. LaPalma Ave., Anaheim, Calif. 92807.

# Entry-Level Text Writer Offered

NEW YORK — Burroughs Corp.'s Office Systems Group has announced the R III System 315 text writer.

The unit is an entry-level word processing unit that offers upward compatibility within the R III series of word processors, the vendor said. The 315 costs about $7,800.

Burroughs also announced two higher level additions to the R III line. The System 325 and System 335 units have double the storage capacity of their predecessors, the 320 and 330, the vendor claimed. Burroughs' Office Systems Group is at 95 Horse Block Road, Yaphank, N.Y. 11980.

# System Speeds PDP-8 Operations

HINGHAM, Mass. — A floating-point and trigonometric processing subsystem that reportedly speeds up arithmetic calculations in Digital Equipment Corp. PDP-8 computers is available from Digital Design & Development, Inc.

The system is a card with supporting software that performs calculations outside the CPU to overlap operations and increase throughput, the vendor claimed.

In addition to 16- and 32-bit fixed and floating-point arithmetic, it performs trigonometric functions, natural and common logs, powers and square roots, a spokesman said.

The price for the system is $1,475, the vendor said from 25 Industrial Park Road, Hingham, Mass. 02043.

# Mitex System Based on PCC 200

ENGLEWOOD CLIFFS, N.J. — Mitex, Inc. has announced a modular Medical/Dental computer system based on a Pertec Computer Corp. PCC 200 processor.

The turnkey system includes accounts receivable management, insurance form processing, production reports, recall processing, appointment scheduling and word processing functions, the vendor said.

The system starts at $4,995, the vendor said from 580 Sylvan Ave., Englewood Cliffs, N.J. 07632.

## *Shipments to Europe To Hit $24 Billion Mark*

NEW YORK — Cumulative shipments to Europe of minicomputers, associated peripherals and software will be valued at $24 billion during this decade, according to a recent market survey. The new report from Frost & Sullivan, Inc. (F&S) also noted that firms will reap $3 billion in separate software sales to European users during the decade.

As a result of these opportunities, F&S predicted European minicomputer makers will become "specialist system suppliers" either in national markets or by application. An additional offshoot of the growth in minicomputer usage on the European scene will be the proliferation of systems houses in Europe.

Within Europe, West Germany will be the largest consumer of data processing products, purchasing $6.7 billion cumulatively through 1989, F&S projected. France and the UK will be the next largest customers for computer ware, each buying $5 billion during the decade. Italy has a sales potential of about $2.2 billion, while Belgium, Sweden and Switzerland will each consume one billion in DP equipment during the same time frame.

By application, the $24 billion in shipments will be used for standard data processing ($9 billion); terminal and data communications ($4.1 billion); and word processing (nearly $2 billion). The remaining $9 billion will be used for industrial applications, F&S predicted.

Applications for the laboratory sector, which have shown hefty growth in the past couple of years, has essentially peaked, F&S claimed. Nevertheless, the market during the decade will account for $700 million in shipments.

In the software sector, F&S projected cumulative sales of $3 billion through the end of the decade. Of this, applications software will total just

*(Continued on Page 70)*

# Univac Sees Fiscal '81 'Best Year' for Sales Despite U.S. Recession

**By Jeffry Beeler**
CW West Coast Bureau

SANTA CLARA, Calif. — Despite recession, inflation and high interest rates, Sperry Univac's U.S. operation expects to enjoy its "best year ever" during fiscal 1981, according to company president Richard Gehring.

For the fiscal year ending March 31, the firm's domestic sales and pretax earnings are expected to show a 17% and 20% increase, respectively, over the previous year's totals, Gehring predicted at a Feb. 11 meeting of West Coast security analysts. During the same period, Univac also foresees a 15% jump in its U.S. bookings.

On the international scene, the company continues to enjoy strong sales and "tremendous" market potential despite the current economic slowdown and its associated obstacles, Gehring said in an address at Univac's Information Storage Systems Division here.

The combination of brisk international and domestic sales promises to boost Univac's worldwide revenues above the $5 billion mark by 1986, the company president predicted. At present, the vendor's combined yearly sales total roughly $2.7 billion, which accounts for about half of its parent organization's overall gross.

Gehring's optimistic forecasts of Univac's future revenue growth came just two weeks after the firm released its third-quarter 1981 financial statement, which showed sales totaling $689 million, 16% higher than for the comparable period last year. During the same 1981 quarter, the company also amassed $533 million in bookings, an 8% rise over the corresponding 1980 total.

### Unbundling Moves

Much of Univac's recent jump in sales and bookings has resulted from the company's decision to unbundle its software and services. Since the firm's first unbundling move in June 1979, its software and services revenues have swelled steadily. This year, the two intangible products are expected to contribute nearly $100 million to Univac's overall expansion, and by 1986 the figure is projected to quintuple to $500 million, Gehring said.

Univac also attributed its latest business growth to high order rates for the company's CPUs, particularly the 1100/60 and System 80. Since the 1100/60 introduction a year and a half ago, more than 550 of the large-scale mainframes have been ordered, and by the end of the current fiscal year, 500 of the machines are expected to be operating in the field, Gehring predicted.

Thus far, newcomers to Univac's customer base account

*(Continued on Page 73)*

# EDS Acts to Protect Winnings

DALLAS — Electronic Data Systems Corp. (EDS) is seeking a court order to prevent the U.S. from "taking action to nullify, interfere with or abrogate" the $19 million judgment EDS won against the nation of Iran for breach of contract [CW, May 12].

The EDS petition is also seeking to prevent any action that would nullify the order it obtained, which attached certain Iranian funds to pay for the judgment.

The U.S. Justice Department has opposed EDS' request. It maintains that any injunction ordered by a court would be premature because President Reagan has not yet finalized arrangements implementing the agreement which won the release of 52 U.S. hostages from Iran.

EDS is apparently in a strong legal position; it reportedly is the only company to have been awarded a judgment which attached Iranian assets. Currently there are believed to be some 350 claims outstanding against Iran by U.S. companies or individuals.

## *Two Key DG Execs Resign*

WESTBORO, Mass. — Two key executives have resigned from Data General Corp.

The resignations of Jeffrey C. Kalb, vice-president of engineering, and William D. Jobe, vice-president of the General Distribution Division, were effective Feb. 13.

Jobe is joining E.C.S. Telecommunications, Inc. of Dallas as vice-president of marketing. Kalb did not announce his future plans.

Herbert J. Richman, senior vice-president of marketing, will serve as acting director of the General Distribution Division. Richman said the company's plans to market its systems through distributors and retail channels remain unchanged.

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# *Europeans Adopt Guidelines For Flexible Lease Terms*

PARIS — The European Computer Leasing and Trading Association (Eclat) has adopted formal guidelines for flexible lease terms for European users. The guidelines were agreed upon late last month at an Eclat meeting in Zurich.

For a long time, there has been adverse publicity, particularly in the UK, on flexible lease terms, noted Larry Erdman, a spokesman for Eclat. One of the major issues addressed by the Eclat agreement is misrepresentation of lease terms to the lessee and/or to the funding source.

In the past lessors did not always advise clients on options during the lease period, Erdman said. Moreover, some European lessors represented terms to the lessee that were often different than the terms discussed with banks or other sources.

The second most pressing issue Eclat members agreed to was notifying lessees of the actual period of committment for a lease.

Aside from pressure brought by users in the UK, Eclat decided to take definitive action on the issues because IBM offers flexible lease terms in Europe. European lessees who have complaints about the implementation of the guidelines can lodge a complaint with Eclat's Arbitration Committee.

# Industry 'Cram Session' Set For Boston, Wash., L.A.

WALTHAM, Mass. — International Data Corp. (IDC) will hold its annual Computer Industry Briefing Session, a one-day "cram session" on the information processing industry, in Boston, Washington, D.C., and Los Angeles next month.

At each location, IDC's senior research analysts will map out the course of the industry, offering market forecasts and detailed analyses of the latest trends.

Designed to keep industry and operational executives up-to-date on what is happening, the sessions will include topics such as "Technological and Economic Forces in the Marketplace"; "User Spending and Concerns"; "Mainframe and Minicomputer Activity and Prospects"; "Communications Comes of Age"; "Computing for the Masses"; and "IBM Strategy."

The sessions will be held March 2 in Boston; March 4 in Washington, D.C.; and March 9 in Los Angeles. Cost is $345 per session, and additional persons from the same organization can attend for a $295 fee. Each participant will receive a 1981 Briefing Session Notebook, which contains facts, and forecasts for each major segment of the information processing industry.

Additional details and complete registration information is available from Eileen O'Brien at IDC, 214 Third Ave., Waltham, Mass. 02154.

# DP Sales Boom Seen for Europe

*(Continued from Page 69)*

more than one billion, program development software just less than one billion, with the remaining billion spent on systems control software.

**Other Markets**

Other markets examined in the three-volume report include:

- *Serial magnetic storage devices* which are projected to increase to $152 million for 1989, with cumulative sales of $900 million for the decade.
- *Random access storage devices* will have cumulative shipments to Europe of $6 billion by 1989, representing more than 25% of the total hardware shipments during the decade.
- *Printer and terminal* shipments to European users will cumulatively total $2.8 billion by the end of the decade, reaching annual sales of $540 million in 1989.

The 950-page study, "Minicomputer Systems Market in Europe" is priced at $1,950.

It is available from F&S at 106 Fulton St., New York, N.Y. 10038.

# June Exhibition Set On U.S. Fiber Optics

PARIS — The International Marketing Center (IMC) of the U.S. Department of Commerce has announced an exhibition of U.S. fiber-optics products to be held here June 9-11.

Scheduled at the same time as the Paris Air Show, the exhibition will feature space for 21 U.S. fiber-optic vendors along with tutorial seminars, the sponsor said.

More information is available from Information Gatekeepers, Inc., Suite 111, 167 Corey Road, Brookline, Mass. 02146.

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# At 28, I took a chance on Aramco. It paid off in money and assignments most companies reserve for older hands.

## After only four years with Aramco, Dan Christy is managing enormous design projects and making enough money to invest in his own real estate development.

Four years ago, Dan Christy was working for a Houston firm on the design and management of overseas construction projects.

"The work was interesting, it was an excellent company, and the pay was pretty fair," says Dan. "But they wouldn't give me any real responsibility, even though management acknowledged I could do it. I was too young, they said."

So this talented, impatient engineer stopped waiting for opportunity to knock and went out after it. Dan moved to Aramco in Saudi Arabia.

What has the experience been like for the young man who has undergraduate degrees in environmental design and building construction, as well as a master's degree in architecture?

**Aramco judges me on performance, not age.**

"The day I arrived in Dhahran, Aramco gave me all the work and responsibility I wanted. In a short time, I proved I could do it, so they gave me more."

Dan said that Aramco "lays it all out and you can pick up as much as you want."

As far as job satisfaction is concerned, Dan could hardly ask for more. He recently supervised the design of 1,200 Aramco residences. His new assignment is even bigger.

"I'll be right in the middle of it with my fair share of responsibility."

One of the pluses of working for Aramco in Saudi Arabia is that age does not work against you. As Dan says, "If you have the right combination of talent, initiative, experience, and a yen to shoulder responsibility, your age will not be a barrier."

*Dan Christy is one of the many young engineers working for Aramco in Saudi Arabia who have taken giant steps in their careers; and also saved money that they never dreamed possible.*

Aramco is simply too busy to waste young talent and give all the important projects to older hands. If you have skill and commitment, Aramco has assignments to challenge that skill and commitment.

The company has projects that are mind-boggling in size, complexity and cost, ranging from development of the world's largest onshore and offshore oilfields to construction of a vast electrical power system, and to the building of entire communities.

**What makes them stay on and on?**

Will Dan Christy stay on and make a career at Aramco? "Maybe," he says. "I came here in 1977 to give it a try. I was young, had no big personal responsibilities, and was quite dissatisfied with what was happening to me in my job in Houston. So far it has worked out just fine. If it continues this way, I will stay for quite a while."

Aramco does not lock its employees into a contract or time commitment. Good money, challenging work and a pleasant, casual way of life are better ways to keep people.

Aramco pays employees a base salary that's competitive with what they could expect in the States. But Aramco also pays employees in Saudi Arabia after-tax expatriate premium of *40 percent* on the first

*Investing in Florida Land*

# Timeplex Stakes Future on Distributed Sites

By Brad Schultz
CW Staff

LARGO, Fla. — The management of Timeplex, Inc. — the multiplexer maker which recently introduced its Advanced Intelligent Modems — has distributed company operations to several sites domestic and abroad. It figures that small facilities can work faster toward making Timeplex the leading supplier of integrated data communications systems by the mid-1980s than could a single large plant.

In guiding the 12-year-old company toward that goal, Edward Botwinick has brought 23 acres of land here on Florida's west coast and more land elsewhere into the Timeplex portfolio of assets. The real estate holdings will be developed as sites for expanded manufacturing and development operations, but Botwinick has joked that land may be the hottest growth area in data communications.

After a 10-year stint in the investment community, Botwinick helped found Timeplex, where he now bears four titles: board chairman, chief executive officer, chief operating officer and president. The new Transmission Products Division (TPD) in Largo is located near the headquarters of Paradyne Corp. as well as a Honeywell, Inc. plant. Bell Laboratories has a branch about 30 miles south of TPD and an IBM site is some 40 miles to the north.

The rich concentration of high technology in the greater Tampa area will benefit Timeplex in more than one way, Botwinick surmised. Personnel recruitment should be easier, he said, because technical experts attracted to the area by other companies may wind up at TPD, which is slated for swift expansion in the aftermath of the Advanced Intelligent Modems.

Another benefit of proximity to other high-technology plants is purely economic. As Florida spawns what Botwinick predicted will be a second Silicon Valley, the Timeplex land here will probably soar in value — maybe even faster than the value of Timeplex draws from the marketing of data communications equipment.

But that would take some doing. Timeplex revenues have increased at an average annual growth rate of more than 40% since 1972, notwithstanding a sharp operating loss in 1976. Revenues for the fiscal year ending June 30, 1980 were $17.9 million, and Timeplex shareholders have been told to expect revenues for the current fiscal year in the $30 million to $33 million range.

### Three Strategies

Botwinick listed three strategies by which he expects Timeplex to be the world's leading supplier of integrated data communications systems four years from now. They are: a broad expansion of its product base — which now encompasses modems, multiplexers and "technical control" systems for network management; a substantial increase of its sales and service force; and acquisition of funds to subsidize the growth.

By "integrated data communications systems," Timeplex means devices that consolidate control over a data network and increase flexibility of control. Up to 16 Advanced Intelligent Modems can be housed in a single rack-mounted card shelf 10.5 in. high, for example — in any combination of 9,600-, 4,800- or 2,400 bit/sec speeds.

Since Victoria A. Brown became Timeplex's sales vice-president in 1979, the company's sales force has reportedly quintupled in number. As she sees it, the main task of Timeplex sales this year will be to establish strong regional marketing teams — especially in Canada, Western Europe and the Pacific Basin — and to support growth of a new wholly owned UK outlet — Timeplex, Ltd.

In the past year, Timeplex has ended an arrangement by which Western European users bought Timeplex products through Racal-Milgo, Ltd., and now sells to that market directly. Recently, Botwinick struck a deal to place the headquarters for European support in the vicinity of Dublin, Ireland.

Botwinick said he was drawn to Ireland by its tax advantages and the fact that Ireland will sponsor training of Irish workers at appropriate centers in the U.S.

Also in the past year, Timeplex acquired Sunnyvale, Calif.-based Cermetek, Inc., a producer of thick-film hybrid integrated circuits. Cermetek has special expertise in making components for modems and other data communications devices, according to Howard Raphael, president.


$30,000 of base pay, and 20 percent premium on the next $20,000. That can help an employee accumulate a pretty fair-sized bankroll in a short time.

The longer an employee stays with Aramco, the more financially productive it becomes. After 60 months of service, employees become fully vested in Aramco's Savings Plan. The company adds 50 percent to the first 6 percent of salary saved. The contribution increases to 100 percent after 10 years of service.

**Employment Bonus**

An after-tax Overseas Employment Bonus of up to $5,000, paid in a one-time lump sum, makes Aramco employment overseas more attractive than ever today.

Dan was interested primarily in the job challenge and career enhancement when he came to Aramco. But he has made out very well financially, too. Pay raises have accompanied increases in responsibility. All in all, the young Christys are very well set up financially before they've barely had a chance to think about settling down.

It's not all work and no play for Aramco employees like the Christys. Their casual, comfortable lifestyle includes living in a modern house just like one you would

*Dan Christy shoulders job responsibilities in Saudi Arabia that a man his age would seldom be given in the U.S. Aramco is simply too busy to waste young talent.*

find in a warm climate like Arizona, Texas or Southern California.

**Big responsibilities and big vacations**

The Christys enjoy golf and water sports, and they travel to places they once considered out of reach. "We've cruised the Nile, driven through most of Europe, and taken cruises to the Greek Islands. We've even played golf in Spain and Singapore."

*The Christys live a comfortable lifestyle in a well-furnished home that looks very much like homes in the Southwestern U.S.*

All Americans in Saudi Arabia with Aramco get *40 days' paid vacation* every year. Plus about 12 paid holidays. And Aramco pays air fare for annual repatriation trips back to the States. "Next year, we're going to use our repatriation flight as one leg of a trip around the world," says Christy.

**First-rate schools and medical/dental facilities**

For employees who have children, Aramco has an excellent school system in Saudi Arabia. Many of the teachers hold master's degrees. When our SAT scores were compared with a group of United States schools, we ranked with the top 10 percent.

The Aramco schools go through ninth grade. For older children, Aramco pays 80 percent of high school expenses for boarding schools in Europe or the U.S., up to $5,350 per student per year, and pays for the children's trips to visit parents.

If somebody gets sick in Saudi Arabia, the individual is covered by Aramco for *all* medical expenses incurred in Aramco medical facilities, even prescriptions. Our modern hospital has the latest diagnostic and intensive care equipment and is fully accredited by the Joint Commission on Accreditation of Hospitals.

Dental care for Aramco employees and their dependents in Saudi Arabia is excellent, but, unlike medical care, it is not free.

**Find out more about the Aramco head start**

If you think you might be interested in following Dan Christy's example, give us a call. It's confidential and there's no commitment. We have openings for engineers in just about every discipline. Call (713) 750-6965 anytime. Or call toll-free, (800) 231-7577, ext. 6965, Monday through Friday between 7 A.M. and 5 P.M. Central Time.

If you prefer, send your résumé or write for more information to: Aramco Services Company, Dept. CW0223ML04A, 1100 Milam Building, Houston, Texas 77002.

Watch this publication for stories about other engineers who have taken career shortcuts that put them miles ahead of people they graduated with.

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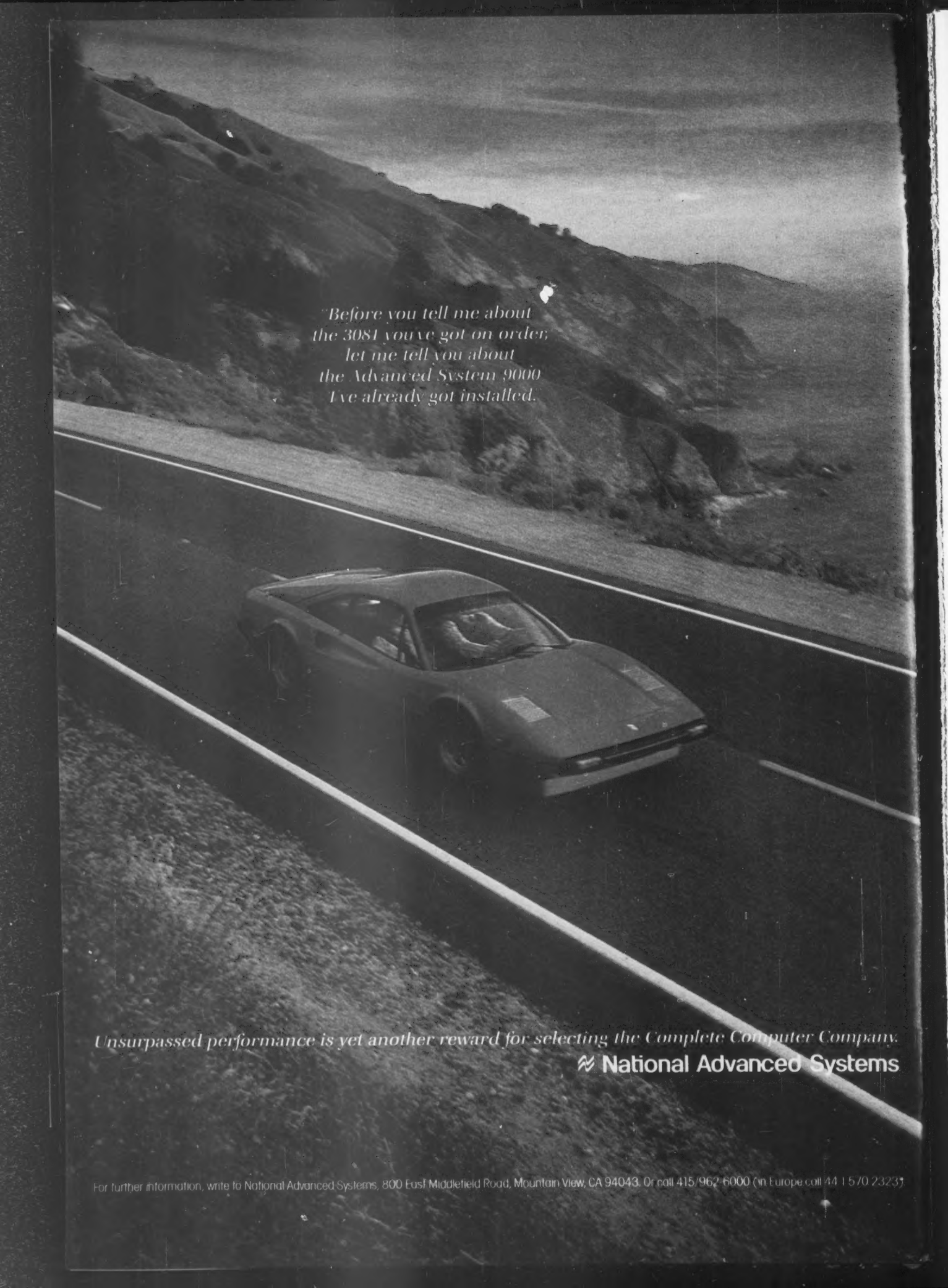
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# Exec Calls Fiscal '81 'Best Year' for Univac

(Continued from Page 69)

for roughly 70% of the company's 1100/60 orders, and more than a third of all the booked processors have been earmarked as replacements for competitive gear, he added.

### System 80 Bookings

On the small- and medium-scale systems side, Univac has booked more than 500 of its System 80s since the product's introduction about nine months ago. The System 80 initial order rate has reportedly set a record for the firm's small- and medium-scale processor line.

Univac's apparent success in the System 80 marketplace has helped increase the company's worldwide customer population to 15,000 and has added to the value of the firm's installed systems base, which now exceeds $12 billion, Gehring said.

Some 80% of Univac's total worldwide business currently comes from six key market segments: manufacturing, energy, airlines, local and state government, federal government and Western Europe. Traditionally, the largest and most important of these segments is manufacturing, which accounts for about 10% of the firm's customer base and which is expected to contribute $600 million in bookings during fiscal 1982.

Possibly the second most critical of the six main market segments is the airlines industry, of which Univac currently holds a 35% share and expects to control more than half before 1986.

In other remarks, Gehring estimated Univac's fiscal 1981 research-and-development (R&D) spending at more than $250 million, four times the company's investment a decade ago. During the past 10 years, he said, R&D expenditures have totaled at least 8% of the vendor's annual worldwide revenues.

# IPL Opens Three New Offices

NEW YORK — IPL Systems, Inc., planning to sell its IBM plug-compatible systems to the end-user market, has opened three new sales offices — here in New York, in Los Angeles and in Boston.

The company expects to open four additional offices in Washington D.C., Philadelphia, Chicago and San Francisco later this year. Ronald Bleakney is vice-president of sales. IPL is also establishing a field-service organization which will work out of each of the regional sales offices.

Up until now, IPL has supplied its midrange IBM plug-compatible processors to Control Data Corp., and Olivetti Corp. computers.

The company claimed it now has more than 150 processors installed in the U.S. and Europe.

IPL offers systems in the IBM 4331-2 and 4341 Model Group 1 and 2.

By expanding into end-user sales, company President Stephen J. Ippolito said he expects IPL to increase its revenue by 50%.

Ippolito also said his firm can fill orders sometimes within 30 days.

# Supershorts

Digital Equipment Corp. has filed suit against Nashua Corp. of Nashua, N.H., charging infringement of DEC's RL disk cartridge patent. The suit alleges that the manufacturing of the Nashua 4433 disk cartridge constitutes infringement of DEC's Patent No. 4208679, and DEC is seeking an injunction barring further infringement and damages.

- - -

Micom Data Systems, Inc. has changed its corporate name to Philips Information Systems, Inc.

- - -

Hazeltine Corp. and Imlac Corp. jointly announced that the new Imlac Series II interactive graphic terminals will be manufactured by Hazeltine at the company's automated production facilities in Greenlawn, N.Y.

- - -

Dr. Gene M. Amdahl, founder of the Amdahl Corp. and the Acsys Corp., will be honored as "Outstanding Entrepreneur of the Year" at the University of Southern Calif. Entrepreneur Program's fourth annual banquet.

- - -

The 100th Honeywell DPS 8 large-scale computer was delivered recently to rental Electronics, Inc. of Palo Alto, Calif. This milestone was reached just eight months after the first shipment of that new line of computers.

- - -

The formation of a special software task force for customized and nonstandard software products has been announced by the Computer Systems Division of Harris Corp.

- - -

TSI International has been chosen as the new corporate name for the merged Turnkey Systems, Inc. and Program Products, Inc.

- - -

Integral Data Systems, Inc. has established a wholly owned manufacturing subsidiary in Puerto Rico and has appointed Donald Decker president of the new center.


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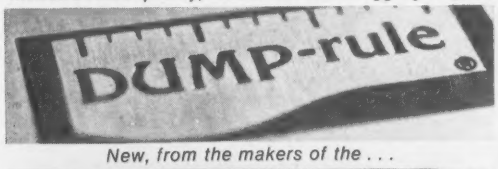


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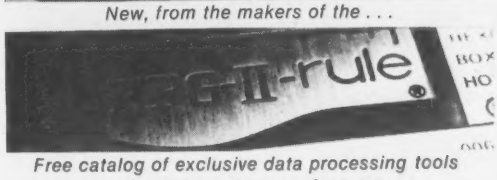


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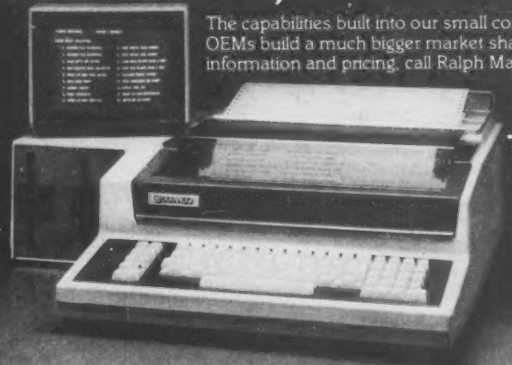

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# Network Systems Reports Earnings Up 151% in 1980

MINNEAPOLIS — Network Systems Corp. posted a 151% increase in earnings and a 60% gain in revenues for fiscal 1980. Earnings for 1980 totaled $1.4 million or 38 cents per share, up from the $568,000 or 18 cents per share earned in 1979.

Revenues totaled just more than $13 million up from $8 million in the prior year.

Figures reported have not been audited or adjusted to reflect the previously announced two-for-one stock split to be distributed Feb. 27 in the form of a 100% stock dividend.

Because of the success of its data communications Hyperchannel systems, a high-speed local network, the firm has filed a registration statement with the Securities and Exchange Commission for a secondary public offering of 1.2 million shares.

The offering, expected to be made at the end of this month, will be managed by Shearson, Loeb, Rhodes, Inc., Montgomery Securities and Dain Bosworth, Inc. The firm made its initial public offering last year.

# Memorex Revamps R&D Work For Future Technological Needs

SANTA CLARA, Calif. — Memorex Corp. has announced the restructuring of the research and development (R&D) operations associated with its Consumer and Computer Media groups in order to place a greater emphasis on future technological needs.

Separate research centers have been formed by the Computer Media Group and Consumer Products Group, both of which were previously served by the Magnetic and Chemical Technology Center. The computer media produced by the Media Group includes tape, rigid disks, disk packs, disk cartridges, flexible disks, word processing supplies and plastics.

The Consumer Products Group manufactures audio and home video tape products, as well as tape and record accessories.

Memorex is headquartered at San Tomas at Central Expressway, Santa Clara, Calif. 95052.

## Mergers/Aquisitions

**Antiope Videotex Systems, Inc.** has formed an American company with France's largest daily financial newspaper, **Les Echos**. Les Echos will be the majority stockholder in the arrangement, which will offer the Didon Antiope and Teletel technologies for the production, exchange and transmission of all types of information and services throughout North America.

**Advanced Computer Techniques Corp.** recently announced the acquisition of **Omega System, Inc.**, a minicomputer and time-sharing organization based in Phoenix, Ariz.

**CGA Computer Associates, Inc.** has completed an agreement to acquire the assets and businesses of **Allen Services Corp.** of Dayton, Ohio, for approximately 1,350,000 common shares of CGA stock.

**Honeywell, Inc.** has plans to acquire **Action Communication Systems, Inc.**, a wholly owned subsidiary of Plantronics, Inc.

**Informatics, Inc.** recently acquired **Transportation Computing Services Corp.** and its subsidiary, **Commercial On-Line Systems, Inc.**, for an undisclosed cash amount.

**AGS Computers, Inc.** has purchased a majority interest in **Micro Distributors, Inc.**, an Eastern wholesale distributor of micro hardware and software.

**Comsat General Corp.'s Integrated Systems Co.** has recently acquired **Comprehensive Computing Systems and Services, Inc.** in a move to strengthen Comsat's position in the computer-aided design, manufacturing and test industry.

**Techtran Industries, Inc.** has signed an agreement to buy **Western Digital Systems, Inc.** for an undisclosed amount.

**McDonnell Douglas Automation Co.** has acquired the assets of **Improved System Technologies, Inc.**, a company specializing in structured systems development methodologies.

**Oxford Software Corp.** has purchased the entire corporate assets of **Worldwide Software Associates, Inc.** for an undisclosed amount.

**Century Analysis, Inc.** has moved to new corporate offices at 114 Center Ave., Pacheco, Calif. 94533. The 17,000 sq ft site includes areas for administration and development, customer training and a 44-terminal communications network.

**Software Dimensions, Inc.** has acquired **Software Concepts, Inc.** the developer of the Accounting Plus software package distributed by Dynabyte Computers, Inc.

**Manufacturing Data Systems, Inc.** has recently merged with **Schlumberger** to form Schlumberger Technology Corp., a wholly owned subsidiary of Schlumberger Ltd.

## Expansions

**Memorex Corp.** has recently completed the repurchasing of its campus-like corporate headquarters and sold a 24-acre site on the opposite side of the San Tomas Expressway, Santa Clara, to **McCandless Cos.**, which plans to develop a $42 million office/research and development park there. Memorex is now the sixth-largest employer in Silicon Valley.

**Ramtek Corp.** has more than doubled its floor space by expanding to a new 100,000 sq ft facility adjacent to its existing building at 2211 Lawson Lane, Santa Clara, Calif. 95050.

**North Star Computers, Inc.** has relocated to bigger headquarters to accommodate its growth at 14440 Catalina St., San Leandro, Calif. 94577.

# Network or inverted file systems, which DBMS is better?

–**E. J. Hawkins,** Manager, Systems & Technical Support, Macmillan, Inc.

**Here is what one qualified person in database software says:**

"Network systems and inverted file systems were designed to meet different requirements. I've had several years experience as a user with both systems. The inverted file system is well suited to rather simple applications. The physical record unit of the system may require that long records be broken up. If your application can conform to the inverted file organization and is one which involves a fairly static database, then the inverted file system should meet your needs.

"On the other hand, the network system can handle more complex applications. If growth and a changing database are in your future, and your requirements include a variety of batch and on-line jobs to be run in production mode, then the network system will best satisfy your needs.

"If you determine that you need a network system, then IDMS is the only way to go. IDMS provides features that are essential in a database management system. IDMS is easy to use, it is transparent to COBOL, and record types accessed together will usually be stored together. IDMS improves hardware efficiency and makes more economical use of memory by reducing data redundancy. In addition, IDMS has a fully-integrated data dictionary, another requirement all database management systems should meet."

Database Systems

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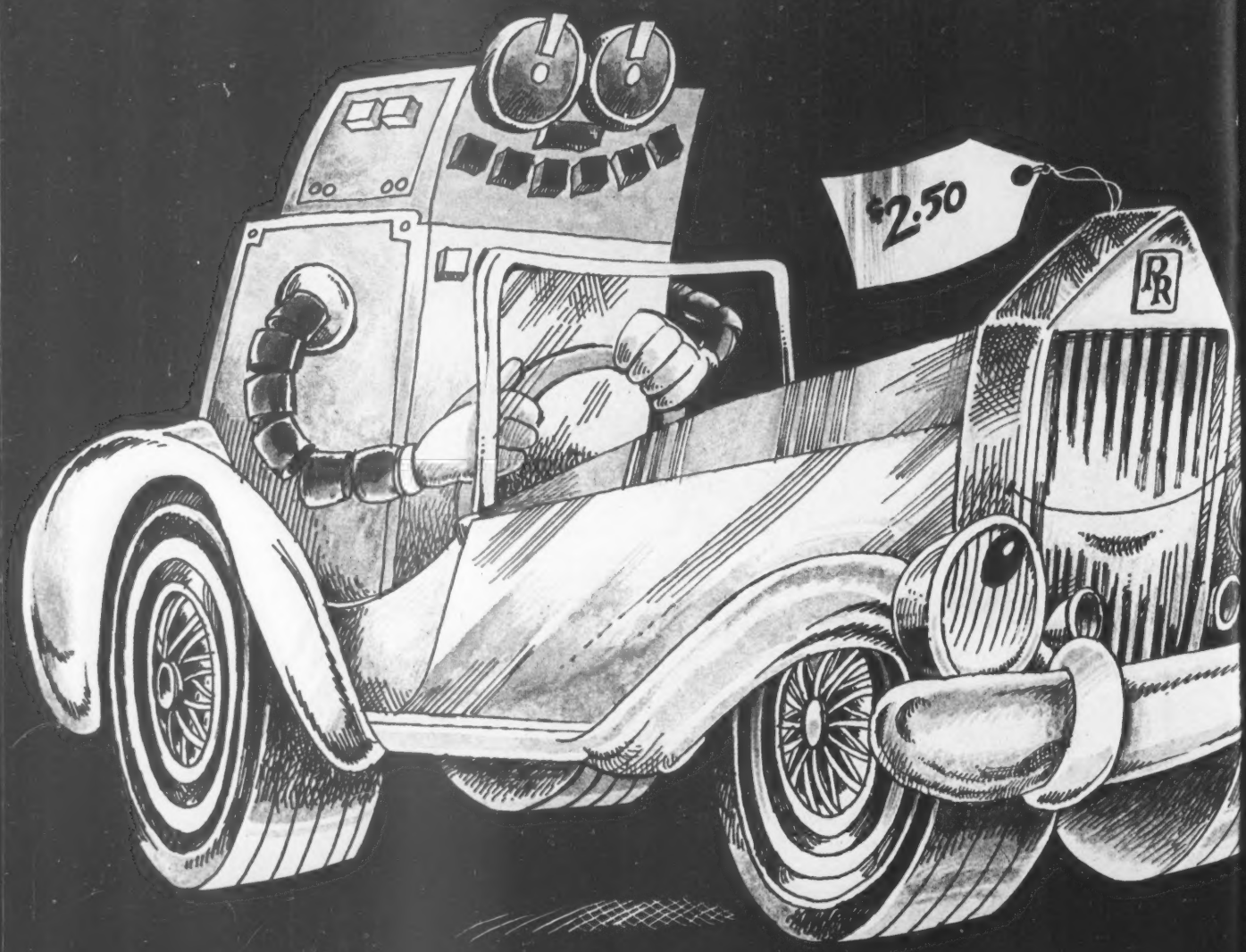
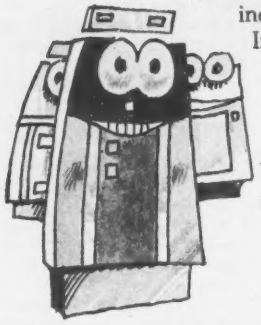
# "If the auto industry had done what the computer industry has done in the last 30 years, a Rolls-Royce would cost $2.50 and get 2,000,000 miles per gallon."



# Computers aren't just an industry, they're a revolution in the way mankind operates. And no one covers this revolution better than we do!

We are CW Communications/Inc. and despite our youth (we'll be 13 this year) we're the world's largest publisher of newspapers and magazines for computer people all over the world.

Most of our publications are weekly newspapers, because so many things happen so rapidly in the computer business (as the headline quote from a prominent industry executive makes so clear).



In only thirty years the industry has gone from the development of the giant Eniac system, through the tube-powered, water-cooled Univac I (the world's first business computer), to the incredibly cheap, battery-powered microprocessor.

But as unbelievable as the last 30 years have been, the next 30 will probably be even more incredible. Right now, IBM has begun delivery of a new computer series that will, by itself, provide four times as much processing power as all the previous computers delivered by the company. And they have announced a new "superconductor" that could improve computer speed and performance by a factor of 500 in the next seven years! It's hard to remember this is real science, not fiction.

This extraordinary increase in efficiency has led to a rapid expansion in computer use, as human ingenuity finds more and more applications for these powerful tools. So the market for computer products and services has turned out to be more elastic than most observers had thought. Worldwide expenditures are currently at $75 Billion, and growing by 20% a year.

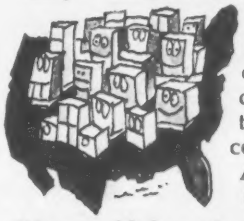
A constant flow of new products; rapid changes in technology; more and more new applications; and large and growing expenditures. It's an industry with a strong need for current, complete and accurate information. Which is where we come in.

Our oldest publication is *COMPUTERWORLD*, a weekly newspaper with a growing all-paid circulation in excess of 105,000 (quite an increase from our modest 7,500 in 1967).

*COMPUTERWORLD* serves America's computer users with the consumer-oriented, objective information they need. And it has become America's top business/professional publication, measured by advertising revenue.

*COMPUTER BUSINESS NEWS* is our weekly newspaper for executives in the U.S. computer industry whose organizations are involved in the manufacture, integration and resale of computer systems. This is a relatively new marketplace which has grown up around the minicomputer and microcomputer, and which shows every sign of very rapid growth for at least the next decade.

The latest phenomenon of the computer industry is personal and desk-top computers and we're covering it with our newest publication, *INFOWORLD*. We report from the user's point of view – with product ratings, and information on using small computers in business and at home. It's a paid circulation, bi-weekly newspaper, and the only publication of its type – located right in the middle of silicon valley — where it's all happening.



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# Nickels & Dimes

**Stratus Computer, Inc.** has recently completed a second round of financing with the sale of $5 million of preferred stock to seven major institutional investors, bringing the firm's total equity financing to $6.7 million.

$$$

**Comdisco Inc.'s** directors declared a five-for-four stock split of its common shares, effective March 6 to shareholders of record on Feb. 20.

$$$

**R.C. Sanders Technology Systems, Inc.** has signed a letter of intent, superceding the one previously reported, providing for the investment of between $1 million and $1.5 million in company stock for a new class of preferred stock, representing approximately 30% of its outstanding equity.

$$$

The board of directors of **Docutel Corp.** has announced a five-for-four split on its common stock and has elected Elserino Poil, a senior executive of the Olivetti Group in Ivrea, Italy, a new director of the company.

# Executive Corner

• Dr. Bernard M. Oliver will retire as vice-president of research and development of Hewlett-Packard Co. effective May 27, Oliver's 65th birthday.

• Dan Matthias has resigned from his position as vice-president of the Exxon Office Systems Co. in order to join Solvation, Inc. He will serve as chairman of the board and chief executive officer of that newly formed intelligent equipment company in Burlington, Mass.

• Bradford R. Sweet has been named director of management information services and marketing administration at Data General Corp.

• Former Mass. Secretary of State Paul Guzzi has joined Wang Laboratories, Inc. as a vice-president. Guzzi will assist Wang president An Wang in various governmental and educational endeavors.

• Eugene J. Franz has been appointed regional vice-president, Twin Cities, for Consumer Systems Services Group, Inc.

• H. Glyn Jordan has recently been named vice-president of Cutler-Williams, Inc., a DP consulting and support firm based in Dallas, Texas.

• James L. Greene has been appointed vice-president of marketing and sales at Haney & Associates, a management consulting firm specializing in systems and DP services for insurance, manufacturing and distribution firms.

• Carlos Santiago has been named vice-president and general manager of the Omnidata Puerto Rican subsidiary, Omnidata Caribe.

• The elections of Chester Gray Jr., Jay Rosen and Eugene Mulhern as vice-presidents and general counsel of GTE operating units was announced recently. Gray now becomes vice-president of GTE Electrical Products; Rosen becomes vice-president of Communications Products; and Mulhern, vice-president of Communications Network Systems.

• R. Tim Mullen has been elected vice-president of technical services at Infotron Systems Corp.

• Ted R. Charter has been named vice-president, business planning, of Diablo Systems, Inc., and Eric Hope has assumed the position of vice-president, field operations at that firm.

• R. Brian Gardiner has been appointed vice-president, development, of Forward Technology, Inc.

• W. John Hammerback has been named vice-president and manager of Computer Assistance, Inc.'s southeast regional operations.

• Geoffrey L. Gardner has been appointed vice-president, plans and programs, at Informatics, Inc.'s federal operations.

• Donald W. Conrad has been named division manager of NLT Computer Services Corp.'s Kansas City-based regional center.

• Russell V. Costanza, former manager of digital products, has recently been promoted to vice-president of development at Universal Data Systems.

• Peter Vicars, formerly director of manufacturing at Perkin-Elmer Corp. data systems division, has joined Micropolis Corp. as vice-president of rigid disk operations.

• Rigdon Currie has joined Atari, Inc. to fill the newly created position of vice-president, marketing.

• Robert V. Dickinson has been appointed general manager of the Text Management Systems Division, at Burroughs Corp.'s Office Systems Group.

• Kenneth Fox has recently been appointed vice-president of research and development for ASK Computer Systems Inc.

• John Verroen has joined Century Data Systems, Inc. as that company's vice-president of finance

• Delphi Communications Corp., an Exxon Communications Systems Co., has announced that Fred Braddock has been promoted to vice-president, product development.

• Donald M. Heath has been promoted to vice-president of operations at Tymnet, Inc.

• Neal Dempsey III has been named vice-president of marketing for Harris Corp.'s Data Communications Division.

• Vicky Mc Manus has been promoted to vice-president of Certified Resource Corp., a Dallas-based data processing consulting firm, and Rod Welch has recently joined that company as sales and marketing manager.

• Alpha Micro, Inc. has named Lloyd M. Lokka to the newly created position of vice-president, marketing.

• Steven C. Burke has been named vice-president of finance at Lear Siegler, Inc.'s Data Products Division.

• Dr. Joseph F. Shea has been named senior vice-president, engineering for Raytheon Co.

• Data Terminal Systems, Inc. has announced the election of J. Robert Schiller as vice-president, major account sales, and David M. Carlson has been appointed vice-president, food industry systems, for that company.

• C. Gerald Diamond has been appointed vice-president of Personal Software, Inc.

• Ira A. Apatoff has been appointed vice-president, financial products at STSC, Inc.

• Anthony Passaro was recently named vice-president of field engineering, and James Jecker was named director of marketing at Micom Data Systems, Inc.

• Max Faircloth has been named vice-president and senior systems analyst at Encore Lodging Systems.

• Richard Taylor has been appointed vice-president of sales at Nixdoff Computer Corp.

• Robert W. Aull has joined EDP of America, Inc. in Edison, N.J., as vice-president of technical services.


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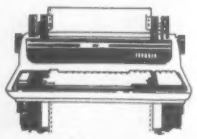
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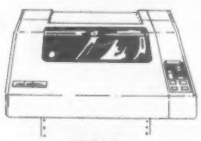
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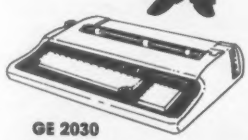
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**PROCESS CONTROL**
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**ADMINISTRATIVE SYSTEMS**
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**PRODUCT DEVELOPMENT**
- Business systems equipment
- Photographic equipment and processors
- Medical products
- Microfilm

**SUPPORT SOFTWARE**
- MVS, IMS, TSO, VM, CICS
- RSTS/E, RT-11, RSX-11M
- RDOS, INFOS, AOS
- Others

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You will be responsible for the technical management of large management information systems development and maintenance projects in the areas of personnel, finance, accounting, sales, marketing, budgeting, and purchasing. This position requires heavy user interaction and technical staff leadership—strong interpersonal skills a must. If you have a proven track record of planning, designing, and implementing successful management information systems, we would like to hear from you. 6+ years of increasingly responsible experience required. BS, MS, or MBA in business, operations research, industrial engineering or related field preferred.

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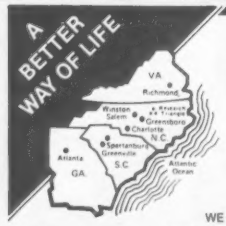


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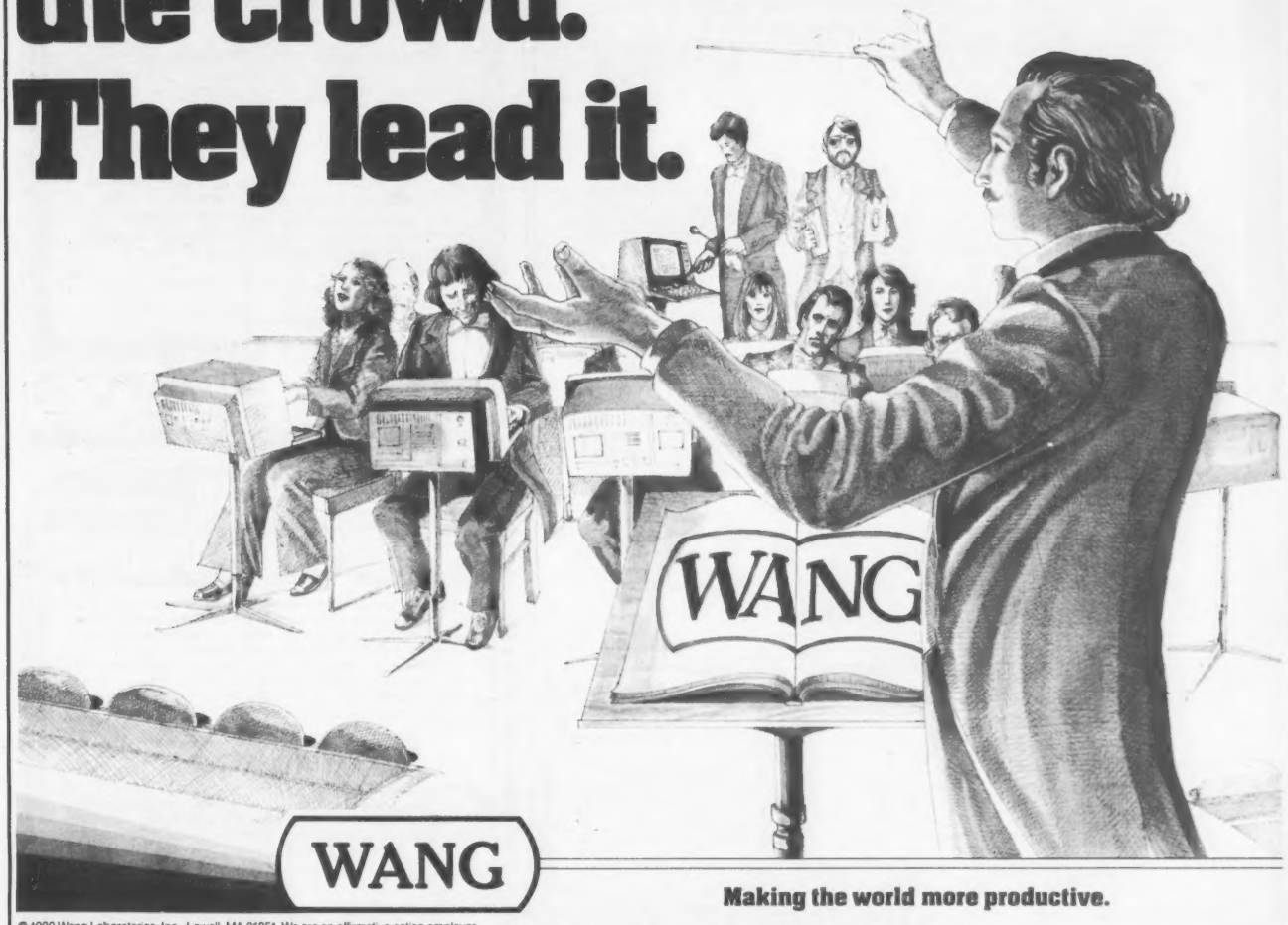


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DATA PROCESSING

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**CHICAGO:** Thos. Hirtz & Associates
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Chicago, Illinois 60606 (312) 977-1555

**CLEVELAND:** Professional Staffing Systems, Inc.
4807 Rockside Road, Suite 300
Cleveland, Ohio 44131 (216) 524-5500

**COLUMBUS:** Michael Thomas, Inc.
65 E. Wilson Bridge Road, Suite 201
Worthington, Ohio 43085 (614) 846-0926

**DALLAS:** DataPro Personnel Consultants
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Dallas, Texas 75240 (214) 661-8600

**DENVER:** EDP Infinity, Inc.
6000 E. Evans Avenue, Building 2-111
Denver, Colorado 80222 (303) 753-1788

**DETROIT:** Electronic Systems Personnel, Inc.
3000 Town Center, Suite 2580
Southfield, Michigan 48075 (313) 353-5580

**FLORIDA:** Data Sciences Personnel, Inc.
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**HARTFORD:** Compass, Inc.
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Hartford, Connecticut 06105 (203) 549-4240

**HOUSTON:** Career Consultants, Inc.
2000 South Post Oak
Houston, Texas 77056 (713) 626-4100

**INDIANAPOLIS:** Computer Personnel Services, Inc.
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Indianapolis, Indiana 46204 (317) 634-4712

**KANSAS CITY:** Electronic Data Personnel, Inc.
7600 State Line, Suite 225-C
Prairie Village, Kansas 66208 (913) 642-1554

**LOS ANGELES:** Constellation Enterprises
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Los Angeles, California 90010 (213) 487-0616

**MILWAUKEE:** EDP Consultants, Inc.
11430 W. Bluemound Road
Milwaukee, Wisconsin 53226 (414) 475-0077

**MINNEAPOLIS:** Electronic Systems Personnel
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New York, New York 10007 (212) 227-7370

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Syracuse, New York 13206 (315) 463-5225

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(919) 373-1461

**PHILADELPHIA:** Systems Personnel, Inc.
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Wallingford, Pennsylvania 19086 (215) 565-2920

**PITTSBURGH:** Electronic Systems Personnel, Inc.
Lawyers Building, Suite 400, 428 Forbes Avenue
Pittsburgh, Pennsylvania 15219 (414) 391-6450

**SAN FRANCISCO:** The Computer Resources Group, Inc. Agency, 303 Sacramento Street
San Francisco, California 94111 (415) 398-3535

**SEATTLE:** Houser, Martin, Morris & Associates
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Bellevue, Washington 98004 (206) 453-2700

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DATA PROCESSING

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Please call the appropriate person listed above or send your resume, in complete confidence, to their attention at National Semiconductor, Professional Employment, P.O. Box 60879, Department 4-51-308, Sunnyvale, CA 94088. An affirmative action employer.

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Corporate Employment Manager - Dept. R-100
National Medical Enterprises, Inc.
11620 Wilshire Blvd., Suite 740
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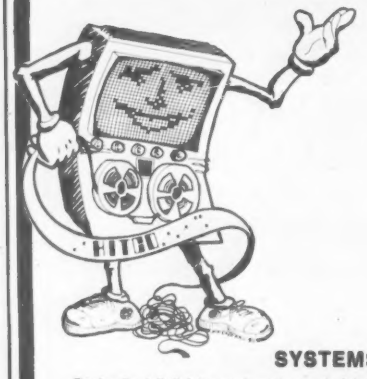


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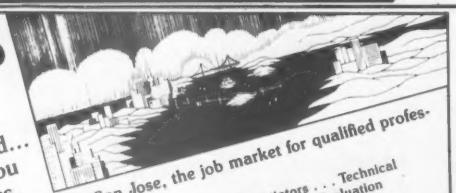

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Applications are now being accepted for current opening in our Data Processing Department. Minimum placement requirements include 2 years as senior level operator plus management or supervisory experience. Competitive salary commensurate with experience and generous benefit package including State of Nevada retirement plan. For further information phone **collect (702) 785-4177,** or contact **WASHOE MEDICAL CENTER, 77 Pringle Way, Reno, Nevada 89520.** Equal opportunity employer.

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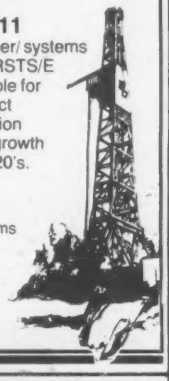

Call or send resume to:
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Tom Brown, Inc.
P. O. Box 2608
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Pacific Northwest

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| Position: | 3 tenure track positions, rank dependent on education and experience. |
| Beginning Date: | 23 August 1981 |
| Salary: | Dependent on qualifications |
| Qualifications: | Applicants should satisfy one of the following: 1) Ph.D. or Ph.D. candidate in Computer Science. 2) Masters Degree or equivalent experience in Computer Science with a Ph.D. in Mathematics or a closely related area. |
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Data Processing

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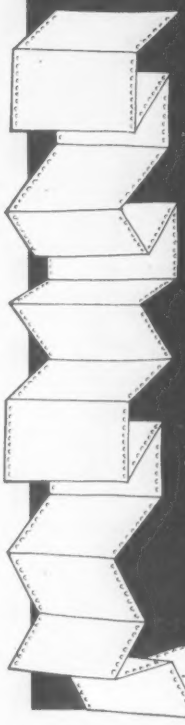

Mexico City is the site of EDS World's major commitment to providing an ever increasing array of sophisticated information systems services to this dynamic nation.

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Additional information may be obtained by calling Mr. Ed Smith collect, at (201) 874-3033. Resumes may be sent, in confidence, to:

Personnel Director

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**SYSTEMS ENGINEERING MANAGER/-DATA COMMUNICATIONS** — Data General Corporation, an industry leader in the design manufacture and sale of general purpose digital computers and computer systems, seeks a Systems Engineering Manager for a position at its Westboro, Massachusetts, facility. The position calls for technical and supervisor responsibility for system and software product support in the area of data communication and requires a comprehensive knowledge of protocols, networking, physical interfaces/-hardware, terminals and hardware/software interfaces, inclusive of operating systems and programming. Specific minimum requirements include a Bachelor's Degree in Computer Science or Electrical Engineering and seven years relevant operating system and programming experience, at least five years of which included working with CCITT Standards, X.25 protocols, Modem Control Standards (RS-232 and V.24) and XODIAC and other related Network Management Systems. Starting salary is $33,200 per year for a five day, forty hour work week and includes medical, life and disability insurances among other industry-competitive benefits. Interested applicants respond with resume to **Mr. Thomas W. Gately, Employee Relations Counsel, Data General Corporation, Mail Station D-134, 4400 Computer Drive, Westboro, Massachusetts 01580. An EOE.**

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AVCO CORPORATION

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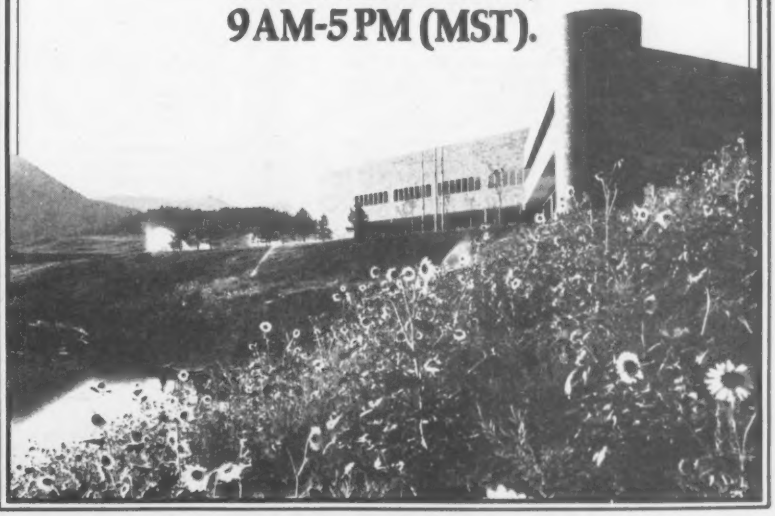

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[redacted]
B R E M E R
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**617/266-0616**
**115 Newbury St., Boston, MA 02116**

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Requirements include two years experience maintaining a large scale IBM operating system. You should also have in-depth knowledge of either MVS or VM externals/internals.

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This position requires two years TP experience supporting VTAM, JES2/RJE, NCP and EP. You should also have four years systems software experience.

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If you have a Master's or PhD in Computer Engineering, Computer Science or Electrical Engineering, and your background includes at least 3 years in the design of real-time control systems and advanced multi-processor architecture, we would like to hear from you. If you're qualified for a leading role in research into fault-tolerant, real-time control applications, and can handle increasing architectural, hardware and software responsibilities, we will describe a most uncommon ground-floor opportunity.

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The person we want — no, the person we must have — has a demonstrated capability to serve as the managerial leader of an existing team of highly competent computer specialists. We require solid knowledge and experience in computer systems in an on-line environment, using multiple computers and remote terminals.

Some experience needed in:

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  - Database
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  - Communications
  - Billing and accounting
- Digital's PDP-11 or VAX-11 — or equivalent

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We offer highly competitive salaries and outstanding company benefits.

For immediate consideration, please send resume to the attention of:

**N. Morrison**
Executive Vice President
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1444 Biscayne Boulevard,
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Miami, Florida 33132

## The Company

We are currently running a trial of the world's most advanced home information system. TV sets, with added electronics built by the Bell System, were supplied to families in Coral Gables, Florida, who are accessing our 20,000 frame database over the telephone network. They are reading the news, ordering merchandise, carrying out banking transactions and much more. The host computer is a 2 megabyte Digital VAX 11/780 for which we developed the software.

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The people we must have possess the skills to function as members of a high-powered team of computer specialists. We require proven capability in the development of real-time systems using Digital PDP-11, VAX 11/780 or similar.

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- Multi-processor systems
- Distributed networks
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## The Benefits

We offer highly competitive salaries and exceptional company benefits. We have a work environment that offers career growth in a rapidly expanding new area. You owe it to yourself to contact us. We need to expand our team and if you would like to be considered, please phone(collect): **Dennis Hall,** (305) 350-6078, or send resume, attention:

**N. Morrison**
Executive Vice President
Viewdata Corporation of America
1444 Biscayne Boulevard,
Suite 305
Miami, Florida 33132

VIEWTRON

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## THE 1980's IT'S DIFFERENT AT THE TOP

**Managing the Data Resource**

The advancement of data processing technology makes managing the data resource a critical challenge to business organizations in the 1980's. Executive management must be assured that the company can exploit the data resource to provide information necessary to remain profitable. Few organizations have this capability.

Nolan, Norton & Company is defining successful approaches for the management of an increasingly important and valuable corporate asset: *Data*.

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- Client Management
- Product Development
- Research Programs

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Benjamin S. Porter, Principal
Room 323

**Nolan, Norton & Company**
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Lexington, Massachusetts 02173
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**Dubuque, Iowa**

CyCare Systems, Inc., North America's largest provider of time and information management systems for medical group practices has the following career opportunities at its headquarters in Dubuque, Iowa.

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At least 2-3 years experience, COBOL, financial and insurance background. Mini experience helpful.

**SENIOR PROGRAMMER ANALYST**
At least 4-6 years experience, COBOL, healthcare, financial and insurance background, Mini experience.

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For more information and a local interview, contact

Bob Clark or Chuck Mills
**(800) 553-4844 or**
**(319) 556-3131**

cycare™
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## SOFTWARE SPECIALISTS

Hooker Chemical, one of the world's largest chemical companies, has immediate openings in our highly sophisticated MIS group located in Grand Island, NY. These positions will be involved with a new IBM 3031-AP System. We are looking for the following personnel:

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If you can't call, send a letter of inquiry or a resume to Ursula at National Advanced Systems, 800 East Middlefield Road, Mountain View, CA 94043. We are an affirmative action/equal opportunity employer m/f/h.

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The successful candidate for the SENIOR ANALYST position (s) will have a BS degree; 5-10 years data processing experience; and in depth knowledge of data base, data communication, systems analysis and design and structural techniques. Knowledge of IMS DB/DC, IMS Data Dictionary, standards and quality assurance helpful. This position, along with our other Systems Assurance Analysis, will support our 3 development staffs in the areas of: structured methods, technical standards, data dictionary, walk-thrus, internal education and quality assurance.

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For further information and an application please write the Personnel Dept., BURLINGTON COUNTY COLLEGE, Pemberton, N.J. 08068. **Completed applications must be postmarked and/or personally delivered to and received by the Personnel Dept. no later than March 13, 1981 in order to receive consideration.** Equal Opportunity, Affirmative Action Employer, M/F.

**DATA SYSTEMS SPECIALIST** — Data General Corporation, an industry leader in the design, manufacture and sale of general purpose digital computers and computer systems, seeks a Data Systems Specialist for a position at its Westboro, Massachusetts, facility. The position provides technical and analysis and consultation support for the design and implementation of the Eclipse commercial data processing systems, and calls for comprehensive knowledge of Data General programming language, file systems and utilities. Minimum requirements include a Bachelor's Degree in Electrical Engineering, Mathematics or Computer Science and at least four years relevant experience interfacing specific commercial user requirements with the technical capabilities of the Eclipse family of minicomputer systems. Also, required is in-depth comprehensive knowledge of COBOL, RPG AND IDEA languages and DG/-DBMS and INFOS file systems and QUERY utilities. Starting salary is $30,700 per year for a five day, forty hour work week and includes medical, life and disability insurances among other industry-competitive benefits. **Interested applicants respond with resume to Mr. Thomas W. Gately, Employee Relations Counsel, Data General Corporation, Mail Station D-124, 4400 Computer Drive, Westboro, Massachusetts 01580. An EOE.**

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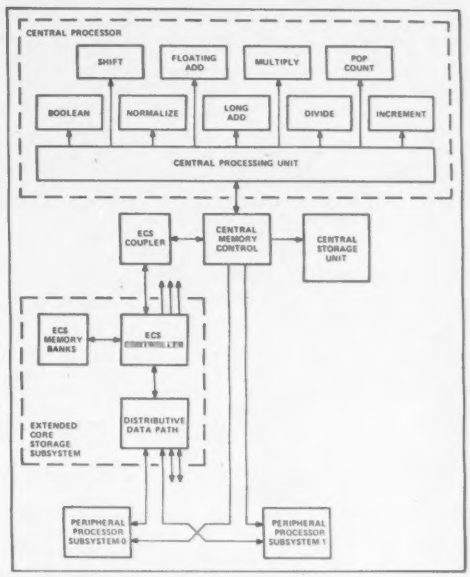


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**CANBERRA ACT AUSTRALIA**

**CSIRO** has a broad charter for research into primary and secondary industry areas. The Organization has approximately 7400 employees - 2500 of whom are research and professional scientists - located in Divisions and Sections throughout Australia.

**FIELD:** Open Systems Architecture

**GENERAL:** The Division of Computing Research operates an Australia wide computer network to provide a computing service to CSIRO, Government and other users located throughout the country. Major host computers used by the Division included a CDC Cyber 76, a CDC Cyber 730, a FACOM M190, two FACOM M150s and a Two Pi V32, and services are offered using the CDC operating systems SCOPE 2 and NOS/BE, FACOM OS IV/F4 and IBM VM370/CMS.

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Are you tired of cold, wet weather, scraping ice from windshields, and the cost of burning fuel oil to keep warm? J.P. International has a critical need for the following data processing professionals to fill sunbelt opportunities that will offer you excellent salary, full benefits, career advancement, relocation expenses, and a fuller, more rewarding life style in an excellent climate.

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| Prog. Anal., System 34, RPG, | to $26K | Prog. Anal., DOS/VS, CICS | to $25K |
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Contact the recognized professional in the sunbelt by sending your resume or calling Mike Mitchell now.

**920 No. Federal Hwy., Suite 234**
**Pompano Beach, Fla. 33062**
**305/941-0205**

*Experienced counselors needed. Partnerships/Franchises Available*

*J. P. International, Inc.*

## Management & Systems Analysis Supervisor

**Salary $25,833-34,563**

Responsible supervisory technical position directing county's management and systems analysis function. Responsibilities include evaluation and development of new data processing applications, maintaining existing systems and coordinating data processing use with county agencies. System: IBM 370/138-DOS/VSE with planned major upgrade in the near future. Requires degree plus 4 years experience in analysis, design and implementation of automated data processing systems, preferably in local government. Related M.S. may be substituted for part of required experience. Liberal fringe benefits. Call or write **Arlington Personnel Dept., 2100 14th St., N., Arlington, VA 22201, phone 703-558-2167,** to obtain employment application.

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## DATA PROCESSING PROFESSIONALS

**Rocky Mountain Area** - Lockwood Corporation is a specialized manufacturer of specialized farm equipment and irrigation systems, located in Gering, Nebraska, 200 miles north of Denver.

**PROGRAMMER/ANALYST** - Minimum of 18 months COBOL.

**SR. PROGRAMMER ANALYST** - Minimum of 2 years CICS command level/COBOL 370/148 DOS/VSE, DL/1, CICS on line programming.

**COMPUTER OPERATOR** - (night shift) 12 hour shift, 3 days/week, shifts differ.

Major areas of interest should include, manufacturing, finance, inventory control, and online communications.

New development in an on line environment.

Resumes, in confidence to: Richard A. Sticker, Manager of Industrial Relations, Lockwood Corporation, P.O. Box 160, Gering, NE 69341. Phone 308-436-5051.

An equal opportunity employer

## SYSTEMS PROGRAMMERS BOULDER, COLORADO

For the National Center for Atmospheric Research. Needed immediately — one person to perform software maintenance and development on the CRAY-1A and one person to perform measurements of network performance and network data flow by designing and implementing software and simulations for the analysis of data flow.

**MAJOR REQUIREMENTS:** Master's degree or equivalent in computer science, engineering, math or physical science. 2-9 years' systems programming experience on large-scale systems, skill in assembly and/or operating system language. FORTRAN or high level programming skills. Also desired are demonstrated skills in modifying operating systems and experience in writing/modifying peripheral equipment drivers. Experience with CRAY operating system is highly desirable. For network measurements, queuing theory applications and system analysis are desirable. Positions are available immediately.

Contact NCAR representatives by any of the three following methods.

1. **Mail resume to:**
   **Employment Office**
   **National Center For Atmospheric Research**
   **P.O. Box 3000**
   **Boulder, Colorado 80307**
2. **Call NCAR's answering service TOLL FREE in order to allow us to contact you:**
   **1-(800) 227-1617 (Nationwide)**
   **1-(800) 772-3545 (Within California)**
3. **Call NCAR directly:**
   **9:00 a.m. to 4:00 p.m.**
   **(303)-494-5151, extension 517 or extension 525**

NCAR

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# Systems Programmers MVS-JES3-IMS

**Openings for Dallas & Lewisville**

Join Texas Instruments in the heart of the Sunbelt. You could work in Dallas, TI's hometown, or just north of Dallas in Lewisville, a growing community of 30,000. Live better in Texas, where cost of living is below the average of major U.S. cities and where there is no state income tax.

TI is building one of the largest worldwide networks of Data Processing Centers. This network is supported from the Dallas headquarters and will include installation and support of major domestic and international computer centers in: Lewisville, Texas; Freising, Germany; Nice, France; Bedford, England; and Tokyo, Japan.

To support this network, we are building a staff of Systems Programmers with MVS, JES3, IMS or TSO background. If you have at least 2 years of systems programming experience and are interested in establishing a long-term relationship with a progressive organization, call: Ed Haynes at 1-800-527-3574 (toll free) or if calling within Texas call (214) 995-4738. Or send your resume to P.O. Box 2103/Richardson, TX 75080. **U.S. citizenship or permanent U.S. residency required.**

TEXAS INSTRUMENTS
INCORPORATED

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## EMPLOYMENT SERVICE FOR PROGRAMMERS AND ANALYSTS

National Openings With Client Companies and Through Affiliated Agencies

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support.

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees. We guide, you decide.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 300, Dublin Hall
1777 Walton Road
Blue Bell, Penna. 19422
(215) 629-0595

RSVP SERVICES
*Employment Agents for Computer Professionals*

**CLASSIFIED ADVERTISING ORDER FORM**
Computerworld's Classifieds work.

**Issue Date:** Ad closing is every Friday, 10 days prior to issue date.

**Sections:** Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Turnkey Systems and Real Estate.)

**Copy:** We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

**Cost:** Our rates are $84.70 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs $169.40 per insertion. Extra space is available in half-inch increments and costs $42.35. Box numbers are $10.00 extra.

**Billing:** If you're a first-time advertiser, (or if you have not established an account with us), WE MUST HAVE YOUR PAYMENT IN ADVANCE.

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Section: _____

Signature: _____

Name: _____

Company: _____ Title: _____

Address: _____

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Telephone: _____

**Send this form to:**
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**375 Cochituate Road, Route 30, Framingham, MA 01701**

## COLORADO! PROGRAMMING COORDINATOR

Responsible for planning, organizing and monitoring programming projects. Also supervises program production and maintenance. Requires B.S. degree in Management Information Systems or related field and three years programming and/or systems design experience, including one year as a project leader preferred. Solid COBOL programming skills a must. Submit resume to:

**Tri-State Generation & Transmission Assn., Inc.**
**Personnel Department CW**
P.O. Box 33695
Denver, Colorado 80233

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TRI-STATE

## L.A./SAN FRANCISCO AREA

**PROJECT MANAGER**
**PROJECT LEADER**
**PROGRAMMER (S)**

Firm expansion provides immediate opportunities to join our Staff of DP professionals.

**SR. FORTRAN.** 4 yrs Fortran on HP 3000, bus. application exp. COBOL a plus. 10% travel.

**SYSTEMS PROGRAMMER.** 3-5 yrs ALC D/L1, IDMS exp. Teleprocessing and Data Base knowledge.

**PROJECT MANAGER.** 5 yrs. min. Solid diversified DP background. On-line business application systems. Exc. communication skills, supervisor exp.

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Good starting salary, excellent advancement and progressive learning opportunities. Qualified candidate(s) send resumes as soon as possible to:

Director of Personnel
JEFFREY L. WALKER & COMPANY
100 Mission Street Suite 300
San Francisco, Ca. 94105

## MINNEAPOLIS/ST. PAUL DIRECTOR OF DATA PROCESSING

NEW EXCLUSIVE LISTING! Our client has begun a search for a solid DP professional to head up their MIS dept. Desired bkgd includes extensive exp in a mfg environment, hardware conversions and mgmt exp at the senior level. You will be responsible for bringing this co's DP efforts to a sophisticated distributed network. Excellent staff. Highly visible upper mgmt position. Solid committment from top mgmt. Salary to $60,000.

Ron Dykstra
ROBERT HALF of Minnesota, Inc.
2236 IDS Center
Minneapolis, MN 55402
(612) 339-9001

## NCR Sr. Programmer and Programmer

To join a $1 1/4 billion savings bank's computer programming section which is responsible for a wide variety of on-line savings, checking, and loan applications. The bank's NCR V8575 Criterion is one of the largest NCR mainframes in the Albany Capital District Metroplex. Team environment. NCR and/or banking background helpful, preferably on a medium to large scale system. Salary commensurate with experience. Outstanding benefits. Forward resume to **Joseph C. Fitzsimmons, V.P. Personnel Officer, Albany Savings Bank, Corner of State and Pearl Sts., Albany, N.Y. 12201.**
EOAAE,M/F

## SYSTEMS ANALYST

3 years or 3 years related experience as Programmer. 4 years of High School. Must know COBOL, FORTRAN and BASIC. Analyze, design & implement computer systems related to CAMP II software package for apparel industry. Maintenance & enhancement of these systems. $24,000 per year, 40 hours per week. **PLEASE SEND RESUMES TO: Data Basics Corp., 151 West 40th Street, New York, N.Y. 10018.**

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It's easy to advertise in COMPUTERWORLD. If you don't have an advertising agency to supply us with copy, layout and order, or a camera ready mechanical, stat or film negative of your ad, just call Sue Stevens at 1-800-343-6474. She will be glad to take your ad and typeset it in available fonts at no extra charge. If you have lengthy ads that require logos and artwork, just send a clean typewritten copy of your ad to the classified advertising department at COMPUTERWORLD (telecopier service is available): note the ad size you want; and, if you want your company logo to appear in your ad, please be sure to include a camera-ready copy with your insertion order. You should also supply any special borders, headlines and artwork that you want in your ad. Our Art Department will follow your suggested layout as closely as possible if you wish to send one.

**Ad closing is every Friday, 6 working days prior to issue date.**

Rates: Open rate is $84.70 per column inch. Columns are 2" wide. Minimum ad size is 2 column inches (1 column wide by 2 inches deep), and costs $169.40 per insertion. Additional space is available in half-inch increments. Some sample sizes and costs are shown.

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Discounts are available when you run more than 35 column inches of advertising in a year anywhere in Computerworld.
Box Numbers are available. $10 per insertion.
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To reserve space for your ad, or if you'd like more information on Classified advertising in COMPUTERWORLD, call our office nearest you.

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**Chicago - (312) 827-4433**
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**Los Angeles - (213) 450-7181**
**TELECOPIER SERVICE - (617) 879-0700**

**William J. Mills, Manager Classified Advertising**

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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**SYSTEMS ANALYST COBOL, DOS, CICS**
(New Systems VTAM, VSAM) . . . To 35K
**SYSTEMS ANALYST RPG-II SYSTEM 34**
(Manufacturing Systems) . . . To 25K
**PROG/ANALYST 370-168 OS/VS-1**
(Systems Design & Analyst) . . . To 25K
**SYSTEMS PROGRAMMER 4341 OS/VS1**
(Generalist for high energy group
Rapid growth potential) . . . To 30K
**PROGRAMMERS COBOL, CICS, VTAM, DOS**
(Lg Mainframe. Gd benefits) . . . To 30K
**PROGRAMMER MICRO SOFTWARE**
(BASIC, Pascal, Business Systems) To 35K
**SR. SYSTEMS ANALYST 3031, OS, VM**
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**PROG/ANALYST**
Accounting Application Help choose new
hardware) . . . To 30K
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Heavy user contact) . . . To 29K
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(New group 3033 on order) . . . To 24K
**DATA COMM SPECIALIST VTAM, NCP5** . . . To 30K
**PROGRAMMERS COBOL, DOS/VS CICS** . . . To 26K
**PROG/ANALYST 370/168 OS/MVS**
Rapidly growing group CPCS System . . . To 30K
**PROGRAMMER 4341 OS/MVS**
(Move into development) . . . To 25K
**PROG/ANALYST PRG-II, 8/34**
(On-line, SSP) . . . To 30K

**Employer retained agency, call or send resume to.**

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SAN FRANCISCO, CA 94111
(415) 362-0911

800 MENLO AVENUE, SUITE 217-A
MENLO PARK, CA 94025
(415) 328-8024

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**COMPUTERWORLD**

# Is Your Income Keeping Pace With the Computer Salary Boom?

## To find out, call today for our new 1981 Computer Salary Survey... It's FREE!

Salaries of computer professionals have risen this year by as much as 20%. Is yours keeping pace? How does your current salary compare with those of other professionals at your level of responsibility and experience? Is your income growth keeping up with inflation? Are you making as much money as you should be—or *could* be? Is your career heading in the right direction?

Now you can easily find out, simply by calling Source Edp and asking for your copy of our just-released, **1981 Computer Salary Survey and Career Planning Guide.** It's yours, *free!*

National salary averages for 1981 are shown for each of 48 categories including programming, software, systems design, data communications, mini/micro systems, data base, EDP auditing, computer marketing, management and many others—at various levels of experience.

The Survey also defines each level of responsibility, shows you how to establish career goals, develop a plan of action, evaluate your progress, take corrective action when necessary and in general, keep your career growth on the best possible course.

This is a career tool every computer professional should have, *especially* if you have most of your career ahead of you.

The 1981 Computer Salary Survey and Career Planning Guide has been compiled by Source Edp, North America's largest recruiting firm devoted exclusively to the computer profession. Since 1966, our annual Survey has helped thousands of computer professionals make the best decisions for their future. And now, at the threshold of sweeping changes in the industry, this new Survey can be of particular importance to you.

Call for your free copy of the 1981 edition today—in strict confidence, and with no obligation whatsoever to use our services.

**source edp**

North America's largest recruiting firm devoted exclusively to the computer professional. Client organizations assume our charges.

## Call today for your FREE report

Simply phone the Source Edp office nearest you

If unable to call, write:

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Suite 1100
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Chicago, Illinois 60606

(When writing, please be sure to indicate home address and current position title.)

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| Irvine | 714/833-1730 |
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| **New Hampshire** | |
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| **New Jersey** | |
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| Edison | 201/494-2800 |
| Paramus | 201/845-3900 |
| Union | 201/687-8700 |
| **New York** | |
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| Wall Street Area | 212/962-9300 |
| Long Island | 516/364-0900 |
| White Plains | 914/683-9300 |
| **North Carolina** | |
| Greensboro | 919/294-6550 |
| **Ohio** | |
| Cincinnati | 513/769-5080 |
| Cleveland | 216/771-2070 |
| Dayton | 513/461-4660 |
| **Oregon** | |
| Portland | 503/223-6150 |
| **Pennsylvania** | |
| Philadelphia | 215/665-1717 |
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| Pittsburgh | 412/261-6540 |
| **Texas** | |
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| Dallas North | 214/387-1600 |
| Fort Worth | 817/338-9300 |
| Houston Central | 713/751-0100 |
| Houston Suburban | 713/626-8705 |
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## AUSTIN, TEXAS
## DEC-10 SYSTEMS PROGRAMMER

A growing state agency offers an attractive career for an experienced DEC system - 10 Systems Programmer. Degree in computer science or math with two years full time experience in Systems Programming on the DEC-10 is required. Salary commensurate with experience. If you would like the opportunity to contribute in a service bureau environment using dual DEC - 1090 CPUS operating under TOPS-10 SMP, send resume and salary requirements to: **Personnel Department P.O. Box 13047 Austin, TX 78711.** An equal opportunity employer.

## COMPUTER OPERATIONS SUPERVISOR

One of the southwest's leading medical centers has an opening for a qualified Computer Operations Supervisor. Rewarding opportunity in an on-line, multi-computer environment. Applicant must have good management organizational and communications skills and want to work in a team environment. Salary will commensurate with experience. **Contact Personnel Dept., Providence Memorial Hospital, 2001 N. Oregon, El Paso, TX 79902.**
**Phone: 915/543-8602**

## SYSTEMS ANALYST

2 years experience or 2 years in Programming, 4 years High School or equivalent. Must have knowledge of COBOL and ASSEMBLER. Design & implement computer systems related to financial institutions. Maintenance & enhancement of these systems, and provide vital skills which ensure their successful and cost effective operation. $482.00 per week to work 35 hours/5 days/week. There are 3 openings for this position. **PLEASE SEND RESUMES TO: Atlantic Information Systems, Inc. 633 Third Avenue, New York, N.Y. 10007.**

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My clients are looking for the exceptional data processing professional. If you are in the top 10% of your field and have a desire to live in the south's most interesting city you owe it to yourself to contact us at Professional Staffing.

We are a highly successful recruiting firm dedicated to the placement of technical professional like yourself. So, if you are looking for unprecedented professional opportunity with an added bonus of warm weather, creole food, and an enviable life style, call collect or write.

**Joe Hotard**
**Data Processing Recruiter**
**Professional Staffing, Inc.**
**1250 Poydras St. Ste 820**
**New Orleans, LA 70112**
**504/524-6095**

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New venture seeking individual with experience on Hewlett Packard mainframe computer equipment. Must have knowledge of H/P product development activities in minicomputers and related fields. Must be capable of managing an information services company and have strong writing and editing skills. Please send resume and salary history to **Mr. Quinn at E.J. Quinn and Associates, Inc., 1629 K St., N.W., Ste. 531, Washington, D.C. 20006.**

## DATA PROCESSING POSITIONS
### CENTRAL CALIFORNIA
### IBM 370-158, BAL OS/VS

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| EDP Auditor | to $35K |
| Technical Support Analyst | to $31K |
| Systems Analyst | to $27.5K |
| Systems Programmer II | to $25K |
| Systems Programmer I | to $21K |
| Programmer, COBOL | to $24K |

For more information please call — in confidence — **Mr. Robert F. Sherwood at 209/222-6866,** or send resume to:
**Pickard, Sherwood & Assoc.**
**Personnel Service**
**114 E. Shaw Ave.**
**Suite 207**
**Fresno, CA 93710**

## FLORIDA
### PROGRAMMER/ ANALYST

Tampa Bay Area Shipyard is seeking a Programmer/Analyst with a minimum of two years heavy experience in COBOL 74 (OS & conversion experience a plus). Send resume and salary requirements in confidence to:

**Director of Personnel**
**Tampa Shipyards Incorporated**
**P.O. Box 1277**
**Tampa, Florida 33601**
*an equal opportunity employer M/F*

## FACULTY POSITION IN COMPUTER SCIENCE

Applications are invited for a nontenurable Assistant or Associate Professorship in computer science starting Sept. 1981 (subject to the availability of funds). The position is renewable to a maximum of three years. There is a possibility that an additional tenure track position in computer science will be available. Salary will depend on the qualifications and experience of the applicant. Preference will be given to applicants with a Ph.D. degree or equivalent industrial experience. **Send vita and three letters of reference to Professor Richard Levin, Dept. of Math and Computer Science, Western Washington University, Bellingham, WA 98225, by May 20, 1981.**

**COMPUTERWORLD**
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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| MS11JP - 32KB mos memory for 11/34 | | | | | $500 |

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896kb - CTS500 Level 3 - Dibol, Basic Plus
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| DATATRIEVE for CTS500 ro RSTS | $2,500 |

**ACCUDATA OF MAINE**
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**BOX 2562 - Augusta, Maine 04330**

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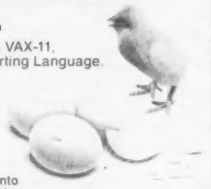

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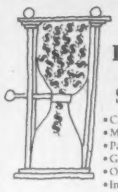

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## ADVERTISERS' INDEX


Allen Services Corp. ... 62
American Airlines/Freight Division ... 56
American Computer Center, Inc. ... 16
American Computer Group ... 68, 78
American Key Data ... 14
American Telephone & Telegraph ... 50-51
Ampex ... SR/33
Ann Arbor Terminals ... SR/18
Applied Data Research ... 3
Applied Software ... 22
Aramco Services Co. ... 70-71

BDS Computer Corp. ... 45
John Beall ... 63
Beehive International ... SR/5
Boeing Computer Svcs. ... 12
M. Bryce & Assoc. ... 46

California Datalease ... 60, 64
Capex Corp. ... 43
CBS ... 39
CD Communications ... 64
Centurion ... 66
Cincom/Systems Software ... 23
Clary Corp. ... ID/10
Codex Corp. ... SR/27
ComData Corp. ... 58
Compumart Corp. ... 8
Computer Associates ... 5
Computer Corporation of America ... ID/22
Computer Devices, Inc. ... SR/7
Computer Maintenance & Leasing ... 64
Consumer Systems ... ID/13-ID/15
Continental Resources ... 78
Cullinane Database Systems, Inc. ... 75
Curtis 1000 ... SR/21
CW International ... 68

Dacoterm ... 22
Data Access Systems ... 69
Data General ... SR/40
Datagraphix, Inc. ... 32
Datapoint ... SR/6
Data Rentals/Sales ... ID/12
Datapro Research Corp. ... 42
Data Systems Services ... 38-39
Dataware, Inc. ... 22
Datum ... 37
Dexel ... 58
Digilog ... SR/37
Digital Equipment Corp./Large Systems ... SR/36
Digital Microsystems ... SR/26
The Discount King ... SR/3
Dupont ... 35
Duquesne Systems ... 47
Durango ... 73

Emulex Corp. ... ID/2-ID/3
Epson America ... ID/11

Federal Communications Corp. ... SR/3

General Electric/Terminet ... 14-15

Harris Data Service ... 22
Hewlett-Packard ... SR/22-SR/23, 52
Hexco, Inc. ... 73
Honeywell Information Systems ... SR/9
Hughes Aircraft ... ID/4

IBM/DPD ... 49
IBM/GSD ... ID/20-ID/21
ICE, Inc. ... 58, 70
Informatics ... 13
Information Concepts ... 22
Innovation Data Processing ... 9
Instor Corp. ... 16
Intel Corp. ... ID/18-ID/19
Iniertec Data Systems ... 33
IPL ... 19
ISSCO ... 19

J&G Industries, Inc. ... ID/11
B.J. Johnson & Assoc. ... 66

Ladenburg, Thalmann & Co., Inc. ... 54
Lanier Business Products ... SR/34-SR/35
Lawrence Packaging Supply Co. ... 56
Lee Data Corp. ... SR/8
Locom Corp. ... 74

3M Company ... SR/14
Mackinney Systems ... 54
Management Science America ... 31
Mannesmann Tally ... 46
Memorex/Communications ... SR/12
Micro Data Base ... 34
Minicomputer Business Applications ... 30
Mitron Systems Corp. ... SR/37
Morino ... ID/16
Modern Software Design ... 21
Mohawk Data Sciences ... SR/11
MTI, Inc. ... SR/28

National Advanced Systems ... 72
NCA ... 12
NCR ... SR/20
Newcorp Products ... 48
Nixdorf Computer Software Co. ... 18
Northern Telecom ... SR/29, SR/30-SR/31
NYG, Inc. ... 16

Ohio Scientific ... 67
Oregon Software ... 58

Perkin-Elmer Corp. ... 59
Phoenix Leasing Corp. ... 56
Prentice ... 60-61
Prime Computer ... SR/16-SR/17
Printer Systems Corp. ... SR/4
Profitunities ... 13

Qwikterm ... 6

Racal Vadic ... 28
Ramtek ... SR/10
Raytheon Datra Systems Co. ... SR/15
Rolm ... ID/8

SDA ... 20, 21
Selecterm ... ID/12
Shetel Enterprises ... 29
Software AG ... ID/5
Software International ... 7
Software Module Marketing ... 44
Solutions, Inc. ... 16
Southern Systems ... 118
Spider Systems ... 71
Storage Technology Corp. ... 17
Sun Information Services Co. ... SR/39
Syncom ... 73
Synergetics ... 36
Systems Industries ... SR/25

Technology Transfer Institute ... SR/24
Tel Com Products Inc. ... SR/28
Teleray ... SR/32
Teleprocessing Products ... 48
Terminal Systems, Inc. ... 73
Texas Instruments ... 24-27
TSI International ... 57
Tuche, Ross & Co. ... 74

United Peripherals ... ID/6-ID/7

Verhoef Information Packages, Inc. ... 61
Volker-Craig, Inc. ... SR/13

Western Union ... 56

Xerox Corp./Diablo Division ... ID/10

Yourdon ... 53

Zenith Data Systems ... SR/19
Zyncon Corp. ... 16


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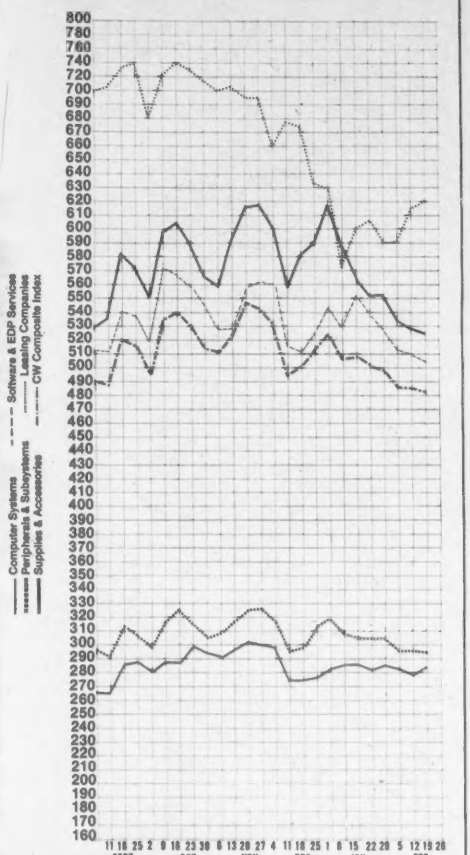
## Computerworld Stock Trading Index

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TRADE QUOTES

# Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, FEBRUARY 18, 1981

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

### COMPUTER SYSTEMS

| E X C H | | 1980-81 RANGE (1) | CLOSE FEB 18 1981 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|
| A | AMDAHL CORP | 15- 42 | 27 | -1 3/8 | -4.8 |
| N | BURROUGHS CORP | 47- 88 | 48 3/4 | 0 | 0.0 |
| O | COMPUTER AUTOMATION | 9- 27 | 13 3/4 | +1 | +8.7 |
| N | CONTROL DATA CORP | 35- 77 | 61 3/8 | -1 1/8 | -1.7 |
| O | CRAY RESEARCH INC | 10- 49 | 33 1/4 | - 5/8 | -1.8 |
| N | DATA GENERAL CORP | 46- 87 | 47 1/4 | -4 3/4 | -9.1 |
| N | DATAPOINT CORP | 22- 60 | 47 3/4 | +4 | +9.1 |
| N | DIGITAL EQUIPMENT | 52- 88 | 83 5/8 | -2 | -2.3 |
| A | EECO INC | 8- 17 | 13 3/4 | + 1/8 | +0.8 |
| N | ELECTRONIC ASSOC. | 6- 12 | 7 1/8 | + 1/4 | +3.6 |
| N | FOUR-PHASE SYSTEMS | 19- 49 | 18 3/4 | + 1/4 | +1.3 |
| N | FOXBORO | 31- 59 | 48 1/2 | -1 1/4 | -2.5 |
| O | GENERAL AUTOMATION | 7- 19 | 9 1/8 | + 1/8 | +1.3 |
| O | GRI COMPUTER CORP | 1- 3 | 1 1/2 | 0 | 0.0 |
| N | HARRIS CORP | 25- 55 | 46 | + 1/4 | +0.5 |
| N | HEWLETT-PACKARD CO | 46- 85 | 68 3/8 | +1 5/8 | +1.8 |
| N | HONEYWELL INC | 65-115 | 100 1/4 | -2 1/2 | -2.4 |
| N | IBM | 50- 79 | 62 | - 5/8 | -0.9 |
| O | MAGNUSON COMP SYSTS | 20- 46 | 31 | -2 1/2 | -7.4 |
| N | MANAGEMENT ASSIST | 8- 25 | 14 1/4 | - 1/4 | -1.7 |
| O | MINI-COMPUTER SYST | 1- 6 | 1 5/8 | - 1/8 | -7.1 |
| O | MODULAR COMPUTER SYS | 8- 31 | 17 3/4 | - 3/8 | -2.0 |
| N | NCR | 52- 82 | 58 | + 1/2 | +0.8 |
| N | PRIME COMPUTER INC | 10- 41 | 28 1/8 | - 5/8 | -2.1 |
| N | PERKIN-ELMER | 13- 35 | 29 3/4 | - 1/8 | -0.4 |
| N | SPERRY CORP | 42- 65 | 53 1/4 | - 3/4 | -1.3 |
| O | TANDEM COMPUTERS INC | 13- 76 | 65 1/2 | + 1/4 | +0.3 |
| N | TEXAS INSTRUMENTS | 79-150 | 115 1/2 | -1 1/2 | -1.2 |
| A | WANG LABS. | 17- 60 | 33 | - 7/8 | -2.5 |

### LEASING COMPANIES

| | | | | | |
|---|---|---|---|---|---|
| O | BOOTHE FINANCIAL CP | 13- 27 | 18 3/4 | - 3/4 | -3.8 |
| N | COMDISCO INC | R- *1 | 20 | - 1/8 | -0.8 |
| A | COMMERCE GROUP CORP | 1- 2 | 1 1/8 | 0 | 0.0 |
| A | COMPUTER INVSTRS GRP | 0- 4 | 1/4 | 0 | 0.0 |
| O | CONTINENTAL INFO SYS | 2- 15 | 5 1/2 | + 1/4 | +4.7 |
| M | DATRONIC RENTAL | 3- 5 | 4 1/2 | 0 | 0.0 |
| A | DCL INC | 3- 6 | 2 5/8 | 0 | 0.0 |
| N | DPF INC | 5- 12 | 7 | + 7/8 | +14.2 |
| O | ITEL | 1- 15 | 3/8 | 0 | 0.0 |
| O | LEASPAC CORP | 1- 2 | 3/8 | 0 | 0.0 |
| A | PIONEER TEX CORP | 2- 4 | 3 1/8 | - 1/8 | -3.8 |
| N | RELIANCE GROUP INC | 24- 79 | 68 1/8 | -1 1/8 | -1.6 |
| N | U.S. LEASING | 12- 28 | 24 3/4 | - 3/8 | -1.4 |

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
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| | | | | | |
|---|---|---|---|---|---|
| O | ADVANCED COMP TECH | 1- 8 | 4 7/8 | 0 | 0.0 |
| O | ADVANCED SYSTEMS INC | 12- 15 | 14 1/4 | - 1/4 | -1.7 |
| A | ANACOMP INC | 7- 24 | 18 5/8 | - 5/8 | -3.2 |
| O | ANALYSTS INTL CORP | 3- 14 | 7 3/4 | - 1/2 | -6.0 |
| A | APPLIED DATA RES. | 6- 24 | 17 1/2 | 0 | 0.0 |
| N | AUTOMATIC DATA PROC | 31- 52 | 48 1/4 | + 5/8 | +1.3 |
| O | CGA COMPUTER ASSOC | 8- 17 | 13 | 0 | 0.0 |
| O | COMPUTER HORIZONS | 1- 5 | 2 1/4 | - 1/8 | -5.2 |
| O | COMPUTER NETWORK | 4- 8 | 5 3/8 | - 1/4 | -4.4 |
| N | COMPUTER SCIENCES | 11- 30 | 17 5/8 | + 1/4 | +1.4 |
| O | COMPUTER TASK GROUP | 1- 23 | 14 | +1 | +7.6 |
| O | COMPUTER USAGE | 2- 10 | 8 1/2 | -1 | -13.3 |
| O | COMPUT AUTO REP SVC | 4- 11 | 6 3/4 | 0 | 0.0 |
| O | COMSHARE | 11- 21 | 15 | -1 | -6.2 |
| O | CULLINANE DATABASE | 18- 65 | 34 1/4 | -2 1/4 | -6.1 |
| O | DATA DIMENSIONS INC | 1- 8 | 1 1/4 | 0 | 0.0 |
| O | DATATAB | 1- 4 | 1 | 0 | 0.0 |
| O | DSI CORP | 4- 8 | 5 5/8 | + 1/8 | +2.2 |
| N | ELECTRONIC DATA SYST | 18- 38 | 37 1/4 | -1 1/4 | -3.2 |
| O | INFORMATICS INC | 8- 25 | 22 1/4 | - 5/8 | -2.7 |
| O | INSYTE CORP | 1- 3 | 2 1/4 | - 1/4 | -10.0 |
| O | IPS COMPUTER MARKET. | 1- 4 | 1 | 0 | 0.0 |
| O | KEANE ASSOCIATES | 3- 9 | 5 1/4 | 0 | 0.0 |
| O | KEYDATA CORP | 1- 5 | 7/8 | 0 | 0.0 |
| A | LOGICON | 12- 30 | 29 1/4 | +1 1/8 | +4.0 |
| O | MATHEMATICA INC | 5- 18 | 14 1/2 | + 1/2 | +3.5 |
| O | MATHEMATICAL APP GRP | 7- 32 | 17 | -1 1/2 | -8.1 |
| O | NATIONAL DATA CORP | 10- 38 | 32 1/2 | -1 | -2.9 |
| N | PLANNING RESEARCH | 5- 13 | 7 | + 1/8 | +1.8 |
| O | PROGRAMMING & SYS | 1- 1 | 1 | 0 | 0.0 |
| O | RAPIDATA INC | 4- 11 | 6 3/4 | + 3/4 | +12.5 |
| O | REYNOLDS & REYNOLD | 18- 34 | 19 | + 1/2 | +2.7 |
| O | STSC INC | 6- 28 | 20 1/2 | -1 1/2 | -6.8 |
| O | SCIENTIFIC COMPUTERS | 3- 17 | 11 1/2 | + 1/4 | +2.2 |
| N | TYMSHARE INC | 17- 50 | 42 5/8 | -1 | -2.2 |
| A | URS CORP | 5- 17 | 13 5/8 | - 3/8 | -2.6 |
| N | WYLY CORP | 4- 20 | 12 3/4 | - 1/8 | -0.9 |

### PERIPHERALS & SUBSYSTEMS

| | | | | | |
|---|---|---|---|---|---|
| N | AM INTERNATIONAL | 12- 24 | 11 7/8 | -1 1/8 | -8.6 |
| A | ANDERSON JACOBSON | 8- 25 | 18 | -1 1/4 | -6.4 |
| O | AUTO-TROL TECHNOLOGY | 18- 62 | 30 | - 1/2 | -1.6 |
| O | BERTHIVE INT'L. | 2- 18 | 14 1/4 | + 3/8 | +2.7 |
| A | BELL & HOWELL & NEW | 17- 77 | 79 7/8 | -2 1/2 | -7.8 |
| N | BUNKER RAMO | 17- 41 | 38 5/8 | + 3/4 | +1.9 |
| O | CAMBRIDGE MEMORIES | 1- 9 | 2 3/8 | + 1/8 | +5.5 |
| N | CENTRONICS DATA COMP | 18- 35 | 16 1/8 | -3 5/8 | -18.3 |
| A | CETEC CORP | 3- 8 | 7 1/2 | + 1/2 | +7.1 |
| O | COMPUTER DEVICES INC | 5- 10 | 8 1/2 | - 3/8 | -4.2 |
| O | COGNITRONICS | 1- 10 | 8 1/8 | - 3/8 | -4.4 |
| O | COMPUTER COMMUN. | 2- 10 | 2 3/8 | - 1/8 | -5.0 |
| O | COMPUTER CONSOLES | 4- 29 | 20 | + 1/4 | +1.2 |
| O | COMPUTER TRANSCEIVER | 1- 6 | 5 1/4 | + 1/2 | +10.5 |
| N | COMPUTERVISION CORP | 24- 92 | 63 1/4 | -3 3/4 | -5.5 |
| N | CONRAC CORP | 13- 25 | 19 | + 1/4 | +1.3 |
| A | DATA ACCESS SYSTEMS | 8- 23 | 20 | - 7/8 | -4.1 |
| A | DATAPRODUCTS CORP | 11- 38 | 34 1/2 | + 3/4 | +2.2 |
| O | DATUM INC | 2- 5 | 2 3/4 | 0 | 0.0 |
| O | DECISION DATA COMPUT | 2- 6 | 3 7/8 | - 1/8 | -3.1 |
| O | DELTA DATA SYSTEMS | 1- 3 | 1 7/8 | + 1/8 | +7.1 |
| O | DATARAM CORP | 6- 37 | 9 5/8 | - 1/2 | -4.9 |
| N | ELECTRONIC M & M | 3- 8 | 5 3/4 | - 1/4 | -4.1 |
| O | EVANS & SUTHERLAND | 21- 83 | 55 1/2 | -2 | -3.4 |
| O | FABRI-TEK | 1- 4 | 2 7/8 | + 1/8 | +4.5 |
| O | GENERAL COMPUTER SYS | 1- 11 | 10 | +1 | +11.1 |
| O | GEN'L DATA COMM IND | 8- 22 | 17 | -1 1/4 | -6.8 |
| O | GENERAL TERMINAL CP | 1- 4 | 1 3/4 | + 1/8 | +7.6 |
| N | HAZELTINE CORP | 12- 33 | 21 1/2 | -2 | -8.5 |
| O | INFORMATION INTL INC | 8- 15 | 9 1/2 | 0 | 0.0 |
| O | INTEL CORP | 23- 50 | 38 3/4 | 0 | 0.0 |
| A | LUNDY ELECTRONICS | 4- 17 | 11 1/4 | - 1/4 | -2.1 |
| O | MSI DATA CORP | 5- 18 | 13 1/2 | - 5/8 | -4.4 |
| N | MEMOREX | 10- 34 | 11 7/8 | - 1/8 | -1.0 |
| N | MOHAWK DATA SCI | 10- 31 | 19 1/4 | + 5/8 | +3.3 |
| O | NETWORK SYSTEMS CORP | 27- 48 | 29 3/4 | -2 | -6.2 |
| O | OMEX | 2- 12 | 10 | 0 | 0.0 |
| A | PARADYNE CORP | 9- 37 | 32 1/4 | - 7/8 | -2.6 |
| A | PENRIL CORP | 9- 16 | 12 1/4 | 0 | 0.0 |
| O | RAMTEK CORP | 10- 23 | 16 | -1 | -5.8 |
| O | RECOGNITION EQUIP | 5- 21 | 12 1/2 | -1 | -7.4 |
| O | SCAN DATA | 1- 5 | 2 1/8 | + | +3.0 |
| N | STORAGE TECHNOLOGY | 12- 26 | 18 5/8 | 0 | 0.0 |
| O | SYKES DATATRONICS | 14- 50 | 33 3/4 | -1 1/2 | -4.2 |
| O | T BAR INC | 14- 24 | 20 5/8 | +1 1/8 | +5.7 |
| A | TEC INC | 3- 9 | 4 3/8 | - 1/4 | -5.4 |
| N | TEKTRONIX INC | 42- 70 | 53 5/8 | +3 1/8 | +6.1 |
| N | TELEX | 3- 6 | 5 7/8 | - 1/4 | -4.0 |
| O | TESDATA SYSTEMS CP | 8- 26 | 10 1/4 | + 7/8 | +9.3 |
| A | TIMEPLEX INC | 5- 22 | 12 5/8 | - 1/8 | -0.9 |
| O | WILTEK INC | 1- 3 | 2 3/4 | 0 | 0.0 |

### SUPPLIES & ACCESSORIES

| | | | | | |
|---|---|---|---|---|---|
| A | AMERICAN BUS PRODS | 8- 15 | 14 5/8 | + 1/4 | +1.7 |
| O | BALTIMORE BUS FORMS | 1- 2 | 1/2 | 0 | 0.0 |
| N | BARRY WRIGHT | 8- 22 | 18 7/8 | + 3/8 | +2.0 |
| O | CYBERMATICS INC | 1- 2 | 1 | + 1/8 | +14.2 |
| A | DUPLEX PRODUCTS INC | 11- 18 | 13 7/8 | + 1/4 | +1.8 |
| N | ENNIS BUS. FORMS | 13- 21 | 14 7/8 | - 3/8 | -2.4 |
| N | 3M COMPANY | 48- 83 | 78 3/4 | + 1/8 | +0.2 |
| O | MOORE CORP LTD | 27- 37 | 33 3/8 | - 1/8 | -0.3 |
| N | NASHUA CORP | 20- 35 | 26 1/2 | + 3/8 | +1.4 |
| O | STANDARD REGISTER | 22- 35 | 32 | - 1/4 | -0.7 |
| A | TAB PRODUCTS CO | 8- 30 | 18 3/4 | + 1/4 | +1.3 |
| N | WABASH MAGNETICS | 11- 31 | 30 1/4 | 0 | 0.0 |
| N | WALLACE BUS FORMS | 12- 28 | 24 1/8 | -1 1/8 | -4.4 |

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